'Tis to yͤ Press & Pen we Mortals owe,
All we believe & almost all we know.

All hail ye great Preservers of these Arts,
That raise our thoughts & Cultivate our Parts.

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our Parts.

# THE INSTRUCTOR:

OR,

# *Young Man's Beſt Companion.*

CONTAINING,

SPELLING, *Reading*, *Writing*, and *Arithmetic*, in an eaſier Way than any yet publiſhed; with inſtructions to qualify any Perſon for Buſineſs, without the Help of a Maſter; to write a variety of Hands, with Copies both in Proſe and Verſe; Letters on Buſineſs or Friendſhip; Forms of Indentures, Bonds, Bills of Sale, Receipts, Wills, Leaſes, Releaſes, *&c.*

ALSO *Merchants Accompts* and a ſhort and eaſy Method of *Shop* and *Book-keeping*; with a Deſcription of the Counties and Market-Towns in *England* and *Wales*, and their Product.

TOGETHER with the Method of meaſuring *Carpenters*, *Joiners*, *Sawyers*, *Bricklayers*, *Plaiſterers*, *Plumbers*, *Maſons*, *Glaziers*, and *Painters* Work, &c. The Mode of undertaking each Work, and at what Price; the Rates of each Commodity, and the common Wages of Journeymen; and a Deſcription of *Gunter's* Line, and *Coggeſhall's* Sliding-Rule.

LIKEWISE the *Practical Gauger* made Eaſy; the Art of *Dialling*, and fixing *Dials*; with receipts for *Dying*, *Colouring*, and making *Colours*; and ſome General Obſervations for *Gardening*, through every Month in the Year.

IN THIS WORK IS ALSO GIVEN

## A COMPENDIUM of the SCIENCES of GEOGRAPHY and ASTRONOMY;

CONTAINING

A brief Deſcription of the different Parts of the Earth, and a Survey of the CELESTIAL BODIES.

And ſome uſeful INTEREST-TABLES.

By *GEORGE FISHER*, Accomptant.

The Twenty-Eighth Edition, Corrected and Improved.

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HURST, and J. WALLIS.

1798.

# THE

# PREFACE.

*I NEED ſay but little by way of Preface, in relation to the Uſefulneſs of this Book, the Title Page ſo fully declaring its Contents: But as a Preface is uſually expected; I cannot well avoid ſaying ſomething with reſpect to its Utility.*

*As to the firſt Step of forming the Young Man's Mind for Buſineſs,* viz. *the being inſtructed in, and acquainted with our Mother Tongue,* viz. English, *it muſt be, and is acknowledged by all, to be a neceſſary and principal Qualification in Buſineſs, and therefore it is of great Importance to be well acquainted therewith.*

*In the next Place, to write a good, fair, free, and commendable Hand, is equally neceſſary in moſt, if not in all the Affairs of Life, and Occurrences of Buſineſs.*

*The Young Man is, next, informed how to indite Epiſtles or Letters in a familiar Stile, and on ſundry Subjects and Occaſions: With Directions how to ſubſcribe or conclude a Letter, and alſo to ſuperſcribe or direct Letters, according to the different Ranks and Qualities of the Perſons to whom directed: And this muſt be allowed to be a very great additional Qualification.*

*The next Accompliſhment for a young Man, and largely treated on in this Book, is that excellent Science of* Arithmetic, *both Vulgar and Decimal: Leading him by the Hand, and by eaſy Steps, through its whole Courſe.*

*Again, the young Man is next ſhewn the ingenious Art of Book-keeping after the* Italian *Manner, by way of Double Entry; and that is an Accompliſhment that capacitates him for Buſineſs in the higheſt Degree: Under which Head, he is alſo informed how to draw out, or make various ſorts of Accompts or Writings relating to Mercantile Affairs; as Bills of Lading, Invoices, Accompts of Sales, together with Authentic Examples of Bills of Exchange, with Notes concerning them; likewiſe Bills of Parcels of divers Kind; alſo various ſorts of Receipts,* &c. *All which is expedient for a young Man to know and underſtand, if he would be dextrous in Buſineſs.*

*The young Man is here alſo inſtructed in relation to the Affairs of Buſineſs at the Water-ſide, as to Shipping off and Landing Goods,* &c.

*He hath alſo a Deſcription of* England *and* Wales, *each County being particularly ſpoken of, with reſpect to its Product, Soil, and Extent, and likewiſe the Names of its ſeveral Market-Towns.*

*Here are alſo eaſy, plain, and likewiſe curious Directions for Meaſuring all ſorts of Planes and Solids (Arithmetically and Inſtrumentally) as the Works of Carpenters, Joiners, Sawyers, Bricklayers, Maſons, Plaiſterers, Painters, Glaziers,* &c. *with the Prices of their Works.*

*Here is likewiſe ſhewn the Methods of extracting the Square and Cube Roots, with ſome of their Uſes, in relation to Meaſuring,* &c.

*Alſo Practical Gauging of divers Kinds of Veſſels, Tuns,* &c. *Likewiſe Dialling in various Kinds, with the Repreſentation of ſeveral ſorts of Dials, and how to beautify and adorn them.*

*Next are Precedents of Law-Writings, as Bonds, Bills, Indentures, Wills, Letters of Attorney,* &c.

*Laſtly, ſome Directions relating to the pleaſant and delightful Art of Gardening, with general Obſervations for every Month in the Year.*

*To the whole is now added a compendious Syſtem of Geography and Aſtronomy: The firſt is of great Utility to the trading Part of Mankind, and to thoſe who would have an adequate Idea of what they read, in Hiſtory or otherwiſe, of the Tranſactions in different Parts of the Earth: and the ſecond is of like Service to thoſe who would contemplate the heavenly Bodies, and is purpoſely deſigned, to give the unexperienced Reader ſome ſmall Idea of the almoſt inconceivable Number of Bodies (moſt of them, much ſuperior in Magnitude to our World, as we vainly term it) which the almighty and infinite Creator hath placed in the Univerſe, and exhibited to the View and Conception of Mankind.*

*Alſo a Table of Stamps, being the laſt, as enacted July* 6th, 1797, *on Notes payable on Demand; Bills, or Notes, payable after Date, or Sight; Notes payable on Demand and re-iſſuable after Payment; Foreign Bills of Exchange; Receipts; Bonds and Sundries; with conciſe Tables to buy or ſell by the Great Hundred; and to ſhew the Intereſt of any Sum at* 3, 4, *and* 5 per Cent.

# THE

# INDEX:

## OR,

## TABLE OF CONTENTS.

A

*ABbreviation of Words,* Page 25
*Account of Sales* - - 168
*Addit. of one Denominat.* 48
——*of Money* - - - 50
——*of Avoirdupois Wt.* 52
——*of Troy Weight* - 53
——*of Vulgar Fractions* 130
——*of Decimals* - - 136
*Africa* - - - - - - 281
*Ale Meaſure, Table thereof,* 55
*America* - - - - 282
*An Account of the Counties of* England *and* Wales 254
*An eaſy Method of caſting up Things bought and ſold by the* 100 or 1000 - 160
*Angleſey Iſle* - - - - 269
*Antipodes* - - - - - 245
*Aphelion* - - - - 293
*Apothecaries Weight, Table thereof* - - - 54
*Arithmetic, its Introduction* 44
*Aſia* - - - - - - 277

*Aſtronomy* - - - - 284
*Avoirdupois Weight, Table thereof* - - - - 52

B

*Balance of Account when full* 147
*Balance at the Year's End* 148
*Beer Meaſure, Table thereof* 55
*Bedfordſhire* - - - 255
*Berkſhire* - - - - 254
*Bill of Lading* - - 166
*Bill of Debt* - - - 154
——*another* - - - 165
*Bills of Parcel in ſeveral Trades* - - - - 155

*Bills*

Bills on Book Debts - 157
Bills of Exchange - 162
——of Money borrowed 165
Board Meaſure - - 173
Bonds, Bills, &c. - 321
Book keeping - - - 139
Books of Uſe in the Compting-Houſe - - ib. to 145
Brecknockſhire - - - 271
Bricklayers Work - - 184
——their Prices 187
Buckinghamſhire - - 254
Buſineſs of the Waterſide 168

C.

Cambridgeſhire - - 255
Capital and ſmall Print 31
Cardiganſhire - - - 271
Caermarthenſhire - - ib.
Carnarvonſhire - - 270
Carpenters Plain Rule 235
Carpenters Work - - 181
——their Prices 182
Carrying an Account, when full, to another Folio 148
Certificate Cocket - - 170
Charges of noting and proteſting a Bill of Exchange 166
Cheſhire - - - - - 256
Chimnies to meaſure - 186
Chords, to make a Line of 233
Circle, to meaſure - 205
Climates, what - 247
——Tables of them ib.
Cloth Meaſure, Table thereof 54
Codicil to a Will - - 328
Coggeſhall's Sliding Rule 239
Colleges in Cambridge 255
——in Oxford - 265
Colouring and Dying 310, 311
Comets - - - - - 295
Concerning Coins - - 313
Conſonants, their Uſe - 2
Conſtellations - - - - 298
Copies in Proſe and Verſe 32
Copper, to gauge it - 215
Cornwall - - - - - 256
Counties in England - 254
——in Wales - - 269
——in Scotland - 271
——in Ireland - 273
Cube-Root, to extract it 222
——Uſe thereof 227
Cumberland - - - - 257

D

Debenture, Form thereof 170
Decimal Fractions - - 135
Deed of Gift - - - 328
Degree, its Length - 241
Denbighſhire - - - 270
Denmark - - - - - 276
Derbyſhire - - - - - 257
Devonſhire - - - - - 257
Dialling, the Art of - 302
Digging of Cellars, &c. 199
Diphthongs, their Sound 8
Directions for Joiners, Painters, Plaiſterers, Glaziers, &c. - - - - - - 177
Diviſion - - - - - 78
——Rule for Working 79
——Compound - - 83
——by Table - - 88
——its Proof - 89
——of Money - - 92
——of Vulgar Fractions 133
——of Decimals. - 138
Dorſetſhire - - - 258
Double Rule of Three 112
——Compound of 5 Numb. 115

Double

Double Reverſe - - 114
Dry Meaſure, Table thereof 56
Durham - - 258
Duty of Exciſe - - 214

E

Ecliptic, what 242, 285
Ellipſis, what - - 286
Enderſ. Bill of Exchange 164
England - - - - 254
Entry Outwards - - 168
Entry Inwards - - 169
Equator, what - - 242
Eſſex - - - - 258
Europe - - - 250
Expeditious Way for Board or Glaſs - - - 174
Extraction of the Square and Cube Roots - - 220

F

Familiar Letters on ſundry Occaſions - - 36
Fixed Stars - - 296
——— their Magnitude 297
Flintſhire - - - 270
Form of a Bill of Lading 166
——— of an Invoice - 167
——— of an Account of Sales 168
——— of a Bill of Entry Outw. 168
——— ditto Inwards - 169
——— of a Cocket - ib.
——— of a Debenture - 170
——— of a Bond - - 321
——— of a Bill with a Penalty - - 323
——— ditto from two to one 324
——— a Letter of Attorney 325
Form of a Will - - 326
——— a Codicil - 328
——— a Deed of Gift ib.
——— an Indenture of Apprenticeſhip - - 329
Fractions Vulgar and Dec. 124
France - - - 252

G

Gable-End to meaſure 186
Gardening Obſervations 331
Gauging - - - 212
Generals proper to be known 320
General Rules in Book-keeping 141
General Releaſe - - 330
Geography - - - 241
Geometrical Problems - 230
Germany - - - 275
Glamorganſhire - 271
Glaziers Work - - 177
——— Prices - 178
Globe of the World - 241
Globe to meaſure - - 201
Glouceſterſhire - 259
Golden-Rule direct - 105
——— reverſe - 110
——— double - 112
Great-Britain - - 153
Gunter's Line - - 236

H

Hampſhire - - 259
Having the Breadth of a Board, to know what Length of it will make a Foot Sq. ſuperfic. 173, 235
——— ditto Timber - ib.
Herefordſhire - - 260
Hertfordſhire - - ib.
Horizon, what - - 245

Horizontal.

*Horizontal Dial* - 301
*Huſbands of Ships* - 172
*Hungary* - - - 276
*Huntingdonſhire* - - 260

I

*Indenture for an Apprentice* 329
*In Meaſurement, a Rule for Diſpatch* - - 192
*Ink, black, to make the beſt, a Receipt* - - 34
—— *red* - - 35
—— *to keep from freezing* 36
*Inſtrumental Arithmetic* 234
*Intereſt, Tables thereof* 317
*Invoice, Form of one* 167
*Joiners Work* - - 180
—— *their Prices* - 181
*Journal* - - - 140
*Italy* - - - - 252

K

*Keeping of Books* - 141
*Kent, County of* - - 260
*Keys and Docks for Landing Goods* - - - 171

L

*Lancaſhire* - - 261
*Land-Meaſure, Table thereof* 57
*Land-Meaſure* - - 190
—— *by the Chain* 192
*Latitude and Longitude, what* 243
*Leiceſterſhire* - - 262
*Ledger* - - - 140
*Length of a Degree* - 241
*Letters, their Names and Uſe* 1
—— *Great and Small, and when uſed* - - 2
*Letters, their Sounds and Omiſſion in Pronunciation* 3
*Letter of Attorney* - 325
—— *of a Seamen* - 326
*Letters or Epiſtles on ſundry Occaſions* - - 36
*Letters, their Superſcriptions* 40
—— *their Beginning* 41
*Lighterage and Wharfage* 187
*Lincolnſhire* - - 262
*Line of Chords* - 233
*Liquid Meaſure, Table thereof* 55
*Literal Numbers* - 45
*Long Meaſure, Table thereof* - 56

M

*Mariners Compaſs* - 246
*Maſons Work* - - - 190
—— *their Prices* - ib.
*Maſts of Ships* - 228
*Meaſure, ſuperficial* 172, 199
—— *ſolid* - 208, 195
*Meaſuring of Timber* 195
—— *Board or Glaſs* 173
—— *Glaziers Work* 177
—— *Painters Work* 179
—— *Joiners Work* - 180
—— *Carpenters Work* 181
—— *Bricklayers and Tylers Work* - 184
—— *Paviors Work* 187
—— *Plaſterers Work* 188
—— *Maſons Work* 190
—— *Sawyers Work* 183
—— *Land* - - 191
—— *a Triangle* - ib.
*Menſuration of Planes* 172
*Merchants Accounts* - 141
*Meridians, what* - 242
*Merionethſhire* - 270

*Middleſex*

*Middleſex* - - 262
*Milky-Way* - - 299
*Money of this Nation* 313
*Monmouthſhire* - - 263
*Montgomeryſhire* - - 270
*Multiplication* - 63
——— *Table* - - 64
——— *Compound* - 65
——— *of Money* - 69
——— *of Vulgar Fractions* 132
——— *of Decimals* 137
*Muſcovy* - - 276

N

*Names of Keys and Docks* 171
*Netherlands* - - 274
*Norfolk* - - 263
*Northamptonſhire* - 264
*Northumberland* - ib.
*North Wales* - - 269
*Notes Promiſſory* - 154
*Nottinghamſhire* - 264
*Numbers to be read and to be written* - - 46
*Numeration* - - 44
——— *Table* - 45

O

*Oath Cuſtom-h.* - 170
*Obligation* - - 321
*Obſervations concerning Gardening* - - 331
*Of Chimnies* - - 186
*Oxfordſhire* - - 264

P

*Painting* - - 178
*Painters Prices* - 179
*Parallel Lines* - 232
*Parts of a ſuperficial Foot* 172
——— *of a ſolid Foot* - ib.
*Paving* - - 187
*Pembrokeſhire* - 271
*Pence-Table* - - 49
*Pen, how to hold it* - 28
*Pens, how to make them* 29
*Perihelion* - - 294
*Periæci* - - - 245
*Perpendicular to raiſe* - 230
*Planets, their Names* - 285
——— *their Orbits, Nodes, and Excentricity* 286
——— *ſecondary* - - ib.
——— *their Revolutions* 288
——— *inferior and ſuperior* 290
——— *their annual Periods and diurnal Rotations* 291
*Plaiſtering* - - 188
*Plaiſterers Work, their Prices* 190
*Poland* - - 276
*Poles of the Earth* - 242
*Portugal* - - 251
*Practice Rules with Tables* 115
——— *at* 10d. *or* 11d. *very ſhort* - 118
——— *at* 2s. *a very ſhort Way* - 119
——— *at an even Number of Shillings* 120
——— *at an odd Number of Shillings* ib.
——— *when the Integer bears odd Prices* - - - 121
*Prices of Painters Work* 179
—— *Plaſterers Work* - 190
—— *Joiners Work* - 181
—— *Carpenters Work* 182
—— *Bricklayers Work* 187
—— *Maſons Work* - 190
—— *Smiths Work* - 190
—— *Slaters Work* - 188
—— *Sawyers Work* 184
—— *Glaziers Work* 178
—— *Plumbers Work* 190
*Principality of Wales* - 269
*Proceſſion of the Equinoxes* 293

*Proof of Addition* - 54
—— *of Subtraction* - 59
—— *of Multiplication* - 77
—— *of Diviſion* - 89
—— *of the Rule of Three* 107
*Promiſſory Notes* - 153
*Proteſting Bills of Excha.* 165
*Pyramids, to Meaſure* - 210

Q

*Quadrant, its Deſcription* 301
*Queſt. in Rule of Three* 103

R

*Radnorſhire* - - 271
*Rates of Wharfage and Lighterage* - - 171
*Receipts, Forms of ſuch* 151
*Reducing Brick-work to ſtandard Thickneſs* - 185
*Reduction* - - 93
—— *of Money* - 94
—— *of Avoirdupois Weight* 97
—— *aſcending* - 98,99
—— *deſcending* - 95
—— *of foreign Coins* 101
—— *of Vulgar Fractions* 126
—— *of Decimal Fractions* 133
*Regular Figures* - 204
*Rule of Three direct* - 112
—— *reverſe* - 114
*Ruſſia* - - 276
*Rutlandſhire* - - 266

S

*Sawyers Work* - 183
—— *Prices* - 184
*Secret-writing* - 42
*Short Method of caſting up Bills of Parcels* - 154
*Shropſhire* - - 266
*Slating* - - 188
—— *Prices* - 188
*Smiths Work, their Prices* 190
*Solar Syſtem* - 284
*Solid Meaſure* - 195,208
*Somerſetſhire* - 266
*South-Wales* - - 270
*Spain* - - 251
*Spelling, the Art of* - 9
*Square-Root, to extract it* 218
—— *Uſe thereof* - 225
*Staffordſhire* - - 266
*Stars, fixed* - 296
*Stat. Meaſure of Land reduced to Cuſtomary* - - 193
*Stops, their Uſe* - 22
*Subtraction* - - 57
—— *of Divers Denominations* 59
—— *of Vulgar Fractions* 131
—— *of Decimals* 137
*Suffolk* - - - 267
*Superficial Meaſure* 172, 201
*Superficiality of ſolid Bodies* 201
*Superſcriptions of Letters* 40
*Surry* - - 267
*Suſſex* - - 261
*Sweden* - - 276

T

*Table of Money* - 49
—— *of Avoirdupois Weight* 52
—— *of Troy Weight* - 53
—— *Apothecaries Weight* 54
—— *Cloth Meaſure* - ib.
—— *Wool Weight* - ib.
—— *Liquid Meaſure* - 55
—— *Dry Meaſure* - 56
—— *Long Meaſure* - ib.
—— *Land Meaſure* - 57
—— *Time* - ib.
—— *Stamps* - 315
—— *of the Value of Goods by the great Hundred* - 316
*Tables of Intereſt* - 317

*Tare and Trett*, &c. - 122
*Three, the Rule of* - 105
*Timber Meaſure* - 196
*Triangle to meaſure* - 191
*Tyling* - - 184
——— *Prices* - 187

U

*Value of Gold and Silver* 31,54
—— *of Vulgar Fractions* 129
—— *of Decimal Fractions* 135
*Vector Radius* - 294
*Vowels, their Strength and Force* - - 2
*Uſance ſingle and double* 164
*Uſes of the Square and Cube Roots* - - 225

W.

*Wales* - - 269
*Warwickſhire* - 267
*Waſte-Book* - 139
*Waſte-Book and Journal Entries* - - 142
*Waterſide, Buſineſs there* 168
*Weſtmoreland* - 268
*Wharfage and Lighterage* 171
*Will, Form of* - 326
*Wiltſhire* - - 268
*Wool Weight, Table thereof* 54
*Worceſterſhire* - 268
*Words of the like Sound different in Signification* - 12
*Writing, Directions for its Attainment* - 27
*Writing, ſecret* - - 42

Y.

*Yorkſhire* - - 269

Z.

*Zodiac* - - 292

*Errata.*—In Page 57, Line 4, for 506,880 Barley-corns, read 190,080 Barley-corns.—In Page 177, line 15, for Proper *Dimenſions*, &c. read *Directions*, &c.

# INSTRUCTIONS
# FOR
# YOUTH,
## TO SPELL, READ AND WRITE
## *TRUE ENGLISH.*

### The Use of Letters; which are Vowels and which Consonants; what Diphthongs are, their Number, and how pronounced and written.

THE Deſign of this Book being to inſtruct Mankind, eſpecially thoſe who are young, in the Methods of converſing and tranſacting Buſineſs in the World; therefore that moſt neceſſary Accompliſhment of ſpelling and writing good and proper *Engliſh*, claims the firſt Notice; for let a Perſon write ever ſo good a Hand, yet if he be defective in ſpelling, he will be ridiculed, and contemptibly ſmiled at, becauſe his writing fair will render his Orthographical Faults more conſpicuous. Therefore,

*Firſt*, Take Notice, that of Letters are made Syllables, of Syllables Words, and of Words Sentences, &c.

The letters are in number 26; *viz. a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, ſ, t, u, v, w, x, y,* and *z*; of theſe, *j* and *v* were formerly wrote *i* and *u*; and have for that reaſon been frequently called *i* Conſonant and *u* Conſonant; but they have been of late more properly called *ja* and *ve*. In theſe Letters, we are to obſerve their Names, their Form, and their Force: Their Names, whereby to know them; their Form, whether great or ſmall; and their Force in Pronunciation or Utterance.

Letters are diſtinguiſhed according to their ſound into Vowels and Conſonants: A *vowel* is a Letter that ſoundeth by itſelf, and they be ſix in Number, *viz.* *a, e, i, o, u,* and *y*, the *Greek* Vowel; which alſo is an *Engliſh* Vowel, when it cometh after a conſonant, and hath the ſound of *i*; as in *by, ſly, reply, Syllable,* &c. but is never uſed in Words not derived from a foreign Language, otherwiſe than at their End. A conſonant is a letter that ſoundeth not, except it be joined with a Vowel, for without one of the Vowels no ſyllable can be made; as *b, c, d,* &c. without the Aid of a vowel, cannot be ſounded. Though we have 26 Letters, and ſix of them *Vowels*, yet we have 21 *Conſonants:* for *y*, when ſet before any *Vowel* in the ſame Syllable, becomes a Conſonant; as in *youth, yonder, beyond,* &c. *Note*, that *j* hath the Sound of *g*, as in *join, jangle, jingle,* &c.

When two vowels come or meet together in a Syllable, and are not parted in the pronunciation, but united in one Sound, ſuch are called *Diphthongs*; of theſe there are 13, *viz. ai, ei, oi, ui, au, eu, ou, ee, oo, ea, eo, oa,* and *ie*; as in *maid, faith, either, join, aul, eunuch, ſtout, feed, ſeed, food, brood, ſtealth, wealth, people, ſteeple, boat, goat, heat, beat, feat, friend, field,* &c. *Note*, That in the firſt ſeven Words both *Vowels* are ſounded; but in the other 15, one of them is ſcarcely heard.

There are alſo thoſe that are called *Triphthongs*, where three *Vowels* meet in one ſound; as in *beauty, beau, lieu,* and *quaint:* Likewiſe *ay, oy, uy, aw, ew,* and *ow*, become *Diphthongs* at the end of Words, but are called *improper Diphthongs*; as in *ſay, key, joy, ſaw, bow,* &c. *Note*, *aw, ew,* and *ow*, are commonly ſounded as *au, eu,* and *ou.*

## OF LETTERS GREAT AND SMALL, AND WHEN TO BE USED.

FIRST negatively, *Great Letters* are not to be uſed in the Middle or latter End of a word, except the whole Word be ſo written, as in JEHOVAH, LORD, or in Titles of books, *&c.* For it would be very abſurd to write thus: To Mr. geoRge RoGeRs, in thaMES ſtreet; inſtead of, To Mr. George Rogers, in Thames-ſtreet.

SECOND poſitively. *Great Letters*, or *Capitals*, are to be written at the Beginning of Sentences: as, *Fear God, Honour the King. Know when to ſpeak, and when to hold your Tongue.*

After every Period or full-ſtop, when new matter begins: As, *Some time after that Accident, another happened, which was as follows. On the 16th of May*, &c.

At the beginning of all proper names of Places, Ships, Rivers, &c. as *London*, the *Dreadnought*, *Thames*, *Severn*: Alſo the Chriſtian Names and Surnames, both of Men and Women, muſt begin with great Letters; as *Samuel Sharp*, *Mary Sweetings*, &c.

At the beginning of the more eminent Words in a Sentence: As *Faith is the Foundation of the Chriſtian Religion*; or, if any Word that we have a particular Regard or Deference for; as *God*, *Chriſt*, *King*, *Queen*, &c.

At the Beginning of every Line in Poetry; as,

*Improve your time; Time paſſeth quickly on;*
*Nor doth ſo good ſucceed as that that's gone.*

At the Beginning of the Names of Arts, Sciences, and Trades; as *Writing*, *Arithmetic*, *Geometry*, *Muſic*, *Carpenter*, *Smith*, &c.

*Note*, the perſonal Pronoun I, and the Interjection O, muſt be always wrote in Capitals; for it is ridiculous to write thus: *On Monday laſt i came to your Houſe but you was not at home; o how much it grieved me!*

*Laſtly*, All Noun Subſtantives may begin with a great Letter: and the ſubſtantive may be known by the Signs either of *a*, *an*, or *the* before them; as *a Houſe*, *a Mill*, *an Ox*, *an Aſs*, *the City*, *the River*, &c. But the Adjective (which declares what ſort of a Thing the Subſtantive is) ſhould be wrote with a ſmall letter; as, *the white Horſe*, *the long Rope*, *brown Bread*, *fat Beef*, &c. and ſmall letters are commonly written in all other Places.

*Note*, This Cuſtom of beginning all Subſtantives with Capital Letters, is not followed at preſent by polite Authors.

The ſmall Letter *s* is commonly written *ſ* at the Beginning and in the Middle of a Word, and *s* at the end; but if two of them come together in the Middle of a Word, they may be written thus, *ſs*.

## OBSERVATIONS CONCERNING THE SOUND OF LETTERS, AND WHICH ARE OMITTED IN PRONUNCIATION.

*A* is not ſounded in *Pharaoh*, nor in *Sabaoth*, but as if written *Pharo* or *Saboth*; neither in *Marriage*, but as *Marrige*; alſo *Parliament* as *Parliment*, and *Chaplain* as *Chap-*

*lin*, &c. In ſome proper Names it is not ſounded, but dropt in the Pronunciation; as in *Aaron, Iſaac, Canaan, Balaam*; which are pronounced as if written, *Aron, Iſac, Canan, Balam*; but we muſt except *Ba-al* and *Ga-al*. *A* is ſounded broad, like *aw*, in words before *ld* and *ll*; as in *bald, ſcald, hall, wall, fall.*

*B* is not ſounded in *thumb, dumb, plumb, lamb, doubt, debt, ſubtle*, &c. but ſounded as if written, *thum, dum, plum, lam, dout, det, ſuttle*, &c.

*C* is ſounded hard like *K*, *before a, o*, and *u*, and before *l* and *r*; as in theſe Words, *cane, came, comb, cub, clay, crane, crab*; and ſoft in *cement, city*, and *tendency*: *C* loſeth its ſound in *ſcene, ſcience, victuals*, and *verdict*; likewiſe in *indict, indictment*; alſo before *k*, as in *ſtack, rack, ſtick, thick, brick*. In Words of *Greek* and *Hebrew* Derivation, *C* is ſounded like *K*, as in *ſceptic, ſceleton, Cis, Aceldema*, &c.

*Ch* is ſounded like *K* in many foreign Words, ſome of which occur in the Holy Scripture; as in *Chorus, Chymiſt, Chryſoſtom, Chriſt, Chedarlaomer, Baruch, Archippus*, &c. In the Word *Schiſm*, the Sound of *Ch* is loſt, it being ſounded as if it were *ſiſm*; and in the Words *Rachel, Cherubim*, and *Archbiſhop*, it is ſounded in the *Engliſh* manner. *Ch* in *French* Words ſounds like *ſh*, as in *Chevalier*, pronounced *Shevalier*; *Machine, Maſheen*; *Mareſchal, Marſhal*; *Capuchin, Capuſheen*; *Chaiſe, Shaize*, &c.

*D* is not ſounded in *Ribband*, nor in *Wedneſday*, which are pronounced *Ribbon* and *Wenſday*; the Termination *ed* is often ſhortened into *t*; as *burned, burnt*; *choaked, choakt*; *ripped, ript*; *paſſed, paſt*; *chopped, chopt*, &c.

*E* is not ſounded in *earth*, neither in *hearth*, nor *dearth*, &c. *E final* is that placed at the End of a Word, is ſeldom heard but in Monoſyllables, as in *me, he, ſhe, ye, thee*, &c. where it hath the Sound of *ee*: And in Words derived from foreign Languages, in which *e* hath its perfect Sound; as *Jeſſe, Jubilee, Mamre, Nineve, Candace, Cloe, Unice, Penelope, Salmone, Phebe, Epitome, Cataſtrophe, Gethſemane, Simile, Præmunire*, &c. In all other Caſes *E final* ſerves only to lengthen the Sound, and to diſtinguiſh it from other Words of different Meaning, which are wrote without *e*, and are ſounded ſhort; as in theſe Examples following, *viz. cane, can*; *hate, hat*; *bite, bit*; *fare, far*; *hope, hop*; *made, mad*; *mane, man*; *ſcrape, ſcrap*; *ſtare, ſtar*; *tune, tun*;

*write*, *writ*, &c. In Words of more than one Syllable, it lengthens the Sound of the laſt Syllables, but doth not increaſe the Number of Syllables; as *admire*, *demiſe*, *blaſpheme*, &c. *E* lengthens the Syllable alſo in ſome foreign Words, ſuch as *Eve*, *Tyre*, *Crète*, *Ode*, *Scheme*, *Dialogue*, *Kenite*, and *Shu-la-mite*. *E* is ſeldom wrote after two Conſonants; as in *paſs*, *turn*, *black*; not *paſſe*, *turne*, *blacke*. Yet after *rs* it is uſed, as *horſe*, *nurſe*, *purſe*; not *hors*, *nurs*, *purs*. Alſo the Words ending in *cre*, *gre*, and *tre*, ſound the *e* before the *r*, as in theſe Words; *acre*, *lucre*, *centre*, *ſepulchre*, *tygre*, *maugre*, *mitre*, *luſtre*; which are ſounded as if written *aker*, *luker*, *center*, *ſepulcher*, *tyger*, *mauger*, *miter*, and *luſter*. *E final* alſo ſerves to ſoften *c* and *g*, as in *ace*, *place*, *lace*, *ſpice*, *truce*, *oblige*, *huge*, *age*, &c. If Nouns in *e final* take *s* after them with an Apoſtrophe before it, ſtands for *his*, as the *Pope's Eye*, or the *Eye of the Pope*, the *Table's Foot*, or the *Foot of the Table*. If without an Apoſtrophe, it makes the Plural Number, as *Popes*, *Tables*. Words derived from thoſe wrote with *E final*, ſeldom retain it, as in *writing*, *loving*, *doing*, &c. not *writeing*, *loveing*, or *doeing*; except in the Termination *ge* and *ce* before *able*, as in *changeable*, *peaceable*, &c. *E* ſhould not be written after a Diphthong in theſe Words; *vain*, *main*, *gain*, *fear*, *know*, &c. not *vaine*, *maine*, *gaine*, &c. *E final* is annexed, but not ſounded, in thoſe Words which would otherwiſe end with *i*, *o*, or *u*; as in *die*, *foe*, *ſloe*, *true*, *virtue*, &c. but there are ſome Exceptions, as *do*, *ſo*, *to*, &c.

*Laſtly*, there are ſome Words in which the *final E* doth not lengthen the Sound, as *give*, *live*, *ſome*, *one*, *done*, &c.

*F* in Plurals is changed into *v*; as *wife*, *wives*; *ſtaff*, *ſtaves*.

*G* is not ſounded in *ſign*, *reign*, *gnaw*, *gnat*, *aſſign*, *deſign*, *ſeignior*, *ſeraglio*, *phlegm*, &c. *G* is ſounded ſoft in *gender*, *ginger*, and *gipſey*; but hard in *Gibeon*, *Giberah*, *Gilboa*, *Geth-ſe-mane*; and hard alſo in theſe proper Names, *Gibſon*, *Gilman*, and *Gilbert*; and likewiſe in theſe common Words, *gelt*, *geld*, *girt*, *gimp*, *geeſe*, *gander*, *gamble*, *gather*, *gild*, &c. Obſerve, That if *G* be hard with a long Vowel, *ue* is joined and pronounced in the ſame Syllable; as in *Plague*, *Prague*, *Hague*, *Rogue*, *League*, *Dialogue*, *Catalogue*, &c.

*Gh* in the End of ſome Words, where *au* or *ou* goes before, hath the Sound of *ff*, as in *tough*, *rough*, *cough*, *laugh*, ſounded as if *tuff, ruff, coff, laff*; but *buff, cuff, ſnuff*, and *huff*, muſt be ſo written——*Gh* is not ſounded in *mighty, though, through, Daughter*, and *Vaughan*.

*H* hath Place, but no ſound, in *Chronicle, Chriſt, Ghoſt, John, Rhine, Schedule*, and *Schiſm*, &c. *H* is not ſounded at the End of Words if it be alone, but with *tc* before it, it is ſounded as *ſnatch, watch*, &c.

*I* is not ſounded in *adieu, juice, veniſon, fruit, bruiſe, Saliſbury*; it is ſounded like *ee* in *oblige, Magazine*, and *Machine*, &c. *I* is ſounded long in proper Names ending in *iah*, as *Jeremiah, Hezekiah*; but ſhort in *A-ri-el* and *Mi-ri-am*—*I* is ſounded like *u* in *firſt, dirt, bird*, &c.

*K* is nearly allied in Sound to *C*; but to know when to uſe one, and when the other, *Note*, that *C* hath the Force of *K* only before *a, o, oo*, and *u*, and theſe two Conſonants *l* and *r*; and therefore we muſt not write *kare* for *care, kow* for *cow, krown* for *crown*: And the Uſe of *K* is only before *e, i*, and *u*; wherefore we muſt write *keep, key, knight, kill*, &c. not *ceep, cey, night*, nor *cill*. But the words *Calendar* and *Catharine* are wrote ſometimes *Kalendar*, or *Katharine*. *K* is written after *c* only in pure *Engliſh* Words, ſuch as *back, deck, ſick*, &c for the beſt Authors have omitted it in Words derived from the *Greek* and *Latin*, ſuch as *public, muſic, phyſic*, &c.

*L* is not ſounded in *calf, half, chalk, ſtalk, walk*, thoſe Words being pronounced as if written *caff, haff, chauk, ſtauk, wauk*. Neither is *l* ſounded in *Briſtol, Holbourn, Lincoln, ſalmon*, or *chauldron*; theſe are ſounded as if writ, *Briſtow, Hoborn, Lincon, ſammon*, and *chaudron*; nor in *Colonel*, where the firſt *l* hath the Sound of *r*, as *Cornel*.

In the Word *accompt, mp* is ſounded like *un*.

*N* is not heard in *autumn, lime-kiln, ſolemn, limn, hymn, column*, and *condemn*.

O is not ſounded in *people, feoffe, baſon, mutton, yeoman, maſon, righteous, bacon, jeopardy*, and *crimſon*——O ſometimes ſounds like *oo*; as in *doing, moving, proving*, &c. O is not heard in *damoſel, carrion*; which are pronounced as if writ, *damſel, carrin*——*O* is ſometimes ſounded like *i*; as in *women flagon*, pronounced as if *wimmin* and *flagin*. And ſometimes O is ſounded as *u*, as in *money, conduit, conjure, attorney, Monmouth*, &c. being heard as if writ *munney, cunduit, cunjure, atturney, Munmuth*, &c. and it is ſounded like *oo* in, *do, to, prove, move*, &c.

*P* is written, but not ſounded, in *empty, preſumptuous, pſalm, ſumpter, attempt, pſalter,* and *ſymptom*; alſo in *ſumptuous, contemptuous, receipt,* and *conſumptive,* &c.

*Ph* has the Sound of *f*, when together in one Syllable; as in *philoſophy, phyſician, Aſaph,* and *Elephant*; but we muſt not write *filoſophy, fiſician,* nor *Aſaf,* or *Elefant*: *Ph* are parted in *ſhep-herd, up-held,* and in *Clap-ham*; and other ſuch compound Words.

After *Q* always follows *u* in all Words: and in ſome *French* and *Latin* Words they have the Sound of *k*; as in *riſque, liquor, catholique, banquet, conquer, maſquerade, chequer*; pronounced as *riſk, likker, catholik, banket,* &c. to which add *oblique, relique, antique,* &c. which are ſounded as if written *oblike, relike, antike,* &c.

*S* is not ſounded in *iſland, viſcount, iſle,* and *Liſle*: which are pronounced as if wrote *iland vicount, ile,* and *Lile*.

*S* at the End of Words ſounds hard like *z* in Words of the plural Number, and in Words of the third Perſon; as *names, worms, he reads, ſhe bears*: *S* ſounds hard in ſome Words that terminate in *ſion* as in *circumciſion, evaſion, deluſion*; but alſo as a Conſonant ſoft, as in *converſion, commiſſion, dimenſion*. *S* is likewiſe ſounded hard in theſe Words, *raiſe, praiſe, chaiſe, cheeſe, theſe, compoſe, expoſe, bruiſe, refuſe, applauſe, pauſe, clauſe, wiſdom, caſement,* and *damſel*.

*Th* ſounds fine in *thin, think,* and *wrath*; and is ſounded hard in *thee, then, they, that, blythe, tythe,* and *ſcythe*; alſo in *mother, brother, hither, thither*; and in *lothe, clothe,* and *clothier,* &c.

*Ti* before a Vowel or a Diphthong, hath the Sound of *ſi* or *ſh*, as in *patience, dictionary, Grecian, oblation, nation, tranſlation*; except when *ſ* goes juſt before it, as in theſe Words, *queſtion, fuſtian, baſtion, combuſtion, celeſtial,* and *beſtial,* &c. But in ſome Words of *Hebrew* and *Greek*, it retains its natural Sound, as in *Shealtiel, Phaltiel, Sepatiah, Cotittia, Adrymittium,* and the like; and in the *Engliſh* Derivatives *mightier,* and *mightieſt, emptieſt, emptied, pi-ti-able,* &c.

*U* is ſounded like *i* in *bury, birry*; *buſy, bizzy*; *buſineſs,* as *bizzineſs*. *U* is ſometimes written after *g* without being ſounded, as in *guide, guard,* &c. It is alſo ſilent in the Words, *buy, built, conduit, circuit, labour, favour, honour,* &c. but it is ſounded in others, as *anguiſh, languiſh, Montague,* &c.

*W* is not ſounded in *anſwer*, *ſword*, *wore*, *ſwoon*, &c. neither is it heard before *r* in *wrap*, *wrath*, *wrong*, *wretch*, *wrangle*, *wriggle*, &c.

*Wh* belongs to Words purely *Engliſh*; as *what*, *when*, *where*, and *wheel*.

*X* is ſounded as *z* in *Xenophon*, *Xerxes*, *Xenocrates*, and *Xantippe*.

*Y* is either a Vowel or Conſonant as hinted before: A Vowel in *my*, *by*, *fly*, *thy*; and ſometimes, when a Vowel, it hath the Sound of *ee*, as in *worthily*, *chriſtianity*, *liberty*, *formerly*, *formally*, *Normandy*, and, *Dorothy*. In Derivative *Engliſh* Words, having the Termination *ing*, *y* is uſed in the Middle of the Word, as in *buying*, *dying*, *burying*, *marrying*, &c.

The Diphthongs *ai* and *ay*, have the Sound of an *a* in *air*, *fair*, *pair*, *may*, *ſtay*, *play*; but *a* is loſt in *Calais* (a Town in *France*) and pronounced ſeparately in *Sinai* (a Mountain of *Arabia*).

*Ei* and *ey* are ſounded like *a* in *eight*, *ſtreight*, *neighbour*, *heir*, *veil*, and *convey*; like *e* in *key*; and like *i* in *ſleight*.

*Oi* and *oy* have a Sound peculiar to themſelves; as in *oil*, and *oyſter*; but make no Diphthong in the Derivatives *gang*, *owing*, &c.

*Au* and *aw* commonly keep a proper Sound, as in *augur*, *auſtre*, *daw*, *maw*, *ſaw*, &c. but *u* is loſt in *aunt* and *gauger*, being ſounded as *ant* and *gager*; they make no Diphthong in *Em-ma-us* and *Ca-per-na-um*.

*Eu* and *ew* have an united Sound in moſt Words, as in *eud*, *brew*, *new*, and *grew*; but *eu* is no Diphthong in *Zac-che-us* and *Bar-ti-me-us*.

*Ou* is expreſſed in *foul*, *ſoul*, *proud*, *loud*; and *ow* in *how*, *cow*, and *now*; but *ou* ſounds like *oo* in *ſoup*, (a *French* Diſh) and *Cowper* (a Man's Name) which are ſounded as if *ſoop* and *Cooper*.

*Ee* is no Diphthong in *Be-e-riters*, *Be-er-ſhe-ba*, and in Words beginning with *re*, or *pre*; as *re-en-ter*, *pre-e-minence*; in *Beelzebub* one of the *e's* is not ſounded.

*Oo* is properly ſounded in *cool*, *fool*, *pool*, *root*, and *tool*, but hath the Sound of *u* in *foot* and *ſoot*; it makes no Diphthong in *Co-os*, *co-o-pe-rate*.

*Ea* ſounds like *e* in *ſea*, *pea*, *ream*, *ſeam*, *bread*, *head*, *lead*, *dead*, *leather*, *feather*, *heaven*, *leaven*, and *creature* it is no Diphthong in *ven-ge-ance*, *miſ-cre-ant*, or any *Hebrew*,

*brew*, *Greek*, or *Latin* Words; as in *Kadeſh-Bar-nea*, *Kirjath je-a-rim*; nor in *Ce-ſa-rea*, *i-dea*, *o-ce-an*, *re-al*, *be-a-ti-tude*, *cre-a-tor*; nor in Words beginning with *pre*, as *pre-am-ble*, &c.

*Eo*, is no Diphthong in *dun-ge-on*, *hi-de-ous*, *me-te-or*, *pi-ge-on*, *the-o-ry*, &c.

*Oa* is ſounded as *o*, in *goat*, *boat*, *coat*; it is ſounded broad, as *au*, in *broad* and *groat*, but it is no Diphthong in *Go-a* (a city in *India*) or in the *Hebrew* Words *Zo-an*, *Zo-ar*, and *Gil-bo-a*.

*Ie* before a ſingle Conſonant ſounds like *ee*, as in *brief*, *chief*, and *thief*; but if before two Conſonants, it ſounds like *e*, as in *friend*, *field*; but at the End of *Engliſh* Words the *e* is not *heard*, as in *die*, or *lie*; it is no diphthong in *A-bi-e-zer*, *E-li-e-zer*, nor in the *Engliſh* Words *di-er*, *car-ri-er*, *clo-thi-er*; nor in Words derived from the *Latin*, as *cli-ent*, *o-ri-ent*, *qui-et*, and *ſci-ence*.

*Ui* is ſounded as *u*, in *juice*, *fruit*, and *ſuit*; but *u* is loſt in *conduit*, *built*, and *guiſe*, and is no Diphthong in *je-ſu-it*, *ge-nu-ine*, and *fru-i-ti-on*.

*Æ* and *Œ* are not *Engliſh* Diphthongs; they are uſed in *Æſop*, *Æneas*, *Ætna*, *Cæſar*, *Œdipus*, *Œconomy*, and ſound like *e*; but in common Words they are neglected, as in *equity*, *female*, and *tragedy*; though derived of *æquitus*, *fæmina*, and *tragædia*.

## OF SYLLABLES AND THEIR DIVISION, BEING THE ART OF SPELLING.

A SYLLABLE is a tacking Letters together, and uttering them in one Breath, as *vir-tue*, ſo that *virtue* being thus divided, or taken aſunder, makes two *Syllables*, viz. *vir* and *tue*; which, put together, form the Word *virtue*. And many Times a Vowel, or a Diphthong of themſelves, make a *Syllable*, as in *a-bate*, *e-ve-ry*, *i-dle*, *o-ver*, *u-ſu-ry*, and in *au-ger*, *Eu-ſtace*, *own-er*, *aid-er*, *oy-ſter*, *Eat-on*, *oak-en*.

No *Syllable* can be made, be there ever ſo many *Conſonants*, or ſo few, without the aid of a *Vowel* or *Diphthong*.

The longeſt *Monoſyllables* we have in *Engliſh*, are *length*, *ſtrength*, and *ſtraight*; which could not be ſounded without the Vowel *e* or *i*.

The Art of Spelling may be reduced to theſe four following general Rules or Heads.

1*ſt*. When a Conſonant comes between two Vowels in dividing the Words into *Syllables*, the *Conſonant* is joined to the latter *Vowel*; as in *ſta-ture*, *na-ture*, *de-li-ver*, *a-mi-ty*, &c. except compound Words, which terminate in *ed*, *en*, *eſt*, *eth*, *er*, *ing*, *iſh*, and *ous*; as *coaſt-ed*, *gold-en*, *know-eſt*, *know-eth*, *bear-er*, *fool-ing*, *bar-bar-ous*, *ra-ven-ous*, and *ſub-urbs*.

2*dly*. When two *Conſonants* come together in the Middle of a Word, they are to be parted, if not proper to begin a Word; as *num-ber*, *ſtran-ger*, *for tune*, &c. not *numb-er*, *ſtrang-er*, *fort-une*. When the ſame *Conſonant* is doubled in a Word, the firſt belongs to the foregoing, and the latter to the following Syllable, as in the Rule above, and in theſe Words, *Ab-ba*, *ac-cord*, *an-no*, *ad-der*, &c.

3*dly*. *Conſonants* that begin Words muſt not be parted in the Middle; as, *a-gree*, *be-ſtow*, *re-frain*, &c. not *ag-ree bef-tow*, *ref rain*.——Theſe *Conſonants* may begin Words, *viz*. *bl*, *br*, *ch*, *cr*, *dr*, *dw*, *fl*, *fr*, *gh*, *gl*, *gr*, *kn*, &c. as *blunt*, *break*, *chaw*, *cry*, *draw*, *dwelt*, *fleſh*, *ghoſt*, &c.

4*thly*. When two Vowels come together, not making a Diphthong, they muſt be divided, as in *vi-al*, *va-li-ant*, *Li-o-nel*, *du-el*, *cru-el*, *me-te-or*, and *La-o-di-ce-a*.

### Some particular Notes.

*L* is doubled in words of one Syllable, as *well*, *tell*, *ſwell*, *ball*, *wall*, *fall*, *will*, *hill*, *mill*, &c. But in Words of more than one Syllable, the Word always terminates with ſingle *l*, as *angel*, *Babel*, *hurtful*, *beautiful*, and *dutiful*. Neither muſt *l* be doubled in *always*, *alſo*, *although*; not *allways*, *allſo*, *allthough*, &c. but Words accented on the laſt Syllable muſt be excepted from the Rule above, *viz*. *inſtall*, *recall*, *inroll*, *rebell*, and *repell*.

*Y* muſt be uſed before the Termination *ing*, as *buying*, *lying*, *carrying*, *paying*, *ſlaying*, *burying*, &c.

The long *ſ* muſt never be uſed at the End of a Word, or immediately after the ſhort or ſmall *s*.

*X* ſhould be uſed inſtead of *Ct*, where it appears to have been in the Original; as *reflexion*, *connexion*, rather than *reflection*, or *connection*.

Remember, that if you cannot write out the whole Word at the End of the Line, you muſt break it off at the End of a Syllable, thus——————————————————con-
demn; not thus——————————————————cond-
emn;

emn: Again——————————diſ-charge; not——————————diſc-harge.

*C* muſt not be put between two Conſonants; as *think*, not *thinck*: *thank*, not *thanck*; *brink*, not *brinck*; but if a Vowel goes before *c*, you muſt write *c* before *k*, as *brick*, *thick*, *ſtick*, &c.

*Ph* muſt be retained in Words of a foreign Original, as *prophet*, not *profet*.

Of *S* and *C*. Some people may eaſily drop into Error by miſtaking *S* for *C*, as in the Beginning of the following Words, where *C* hath the perfect Sound of *S*, though *C* muſt be undoubtedly written; *viz.* in

Cieling
Celeſtial
Civet
Certain
Cymbal
Ciſtern
Centurion
Cinnamon
Ceremony
Cellar
Cenſure
Cenſor
Ceaſe
Celebrate
Cell
Cenſer
Celerity
Cypreſs
Circle
Circuit
Cement
Ceruſe
Centre
Cinque
Cypher
City
Citron

But theſe words muſt be written with *S*, *viz.*

Science
Schedule
Sceptre
Scheme
Scarcity
Schiſm
Sciatica
Scythian.

The following Words ſhould be wrote,

| *with* ti | *with* ſi |
|---|---|
| Contention | Confuſion |
| Action | Occaſion |
| Contradiction | Contuſion |
| Attention | Oppreſſion |
| Benediction | Alluſion |
| Apparition | Aſcenſion |
| Concoction | Averſion |
| Declaration | Aſperſion |
| Ambition | Commiſſion |
| Contrition | Comprehenſion |
| Oration | Circumciſion |
| Oblation | Concluſion. |

The following Words ſhould be ſpelt thus:

Paſſion, *not* Paſhon
Faſhion, *not* Fation
Cuſhion, *not* Cution
Saliſbury, *not* Salſbury
Leiceſter, *not* Leſter
Shrewſbury, *not* Shruſbury

Glouceſter, *not* Gloſter
Worceſter, *not* Worſter
Carliſle, *not* Carlile
Weſtminſter, *not* Weſtmiſter.

Another Qualification in Spelling is, rightly to diſtinguiſh Words of the *ſame Sound*, though widely different in their Senſe and Signification; ſuch are theſe that follow:

*ABEL*, *Cain's* Brother
*Able*, to do a Thing
*A Bell*, to ring
*Accidents*, Chances
*Accidence*, a Book
*Acre*, of Land
*Achor*, a Valley of that Name.
*Advice*, Counſel
*Adviſe*, to counſel
*Account*, Eſteem
*Accompt*, or Reckoning
*Ale*, a Drink
*Ail*, Trouble,
*All*, every one
*Awl*, for Shoemakers
*Alley*, a narrow place
*Ally*, a Friend or Confederate
*Allay*, to give Eaſe
*Alloy*, baſe Metal
*Altar*, for Sacrifice
*Alter*, to change
*Alehoof*, an Herb
*Aloof*, at a Diſtance
*Allow'd*, approved
*Aloud*, to ſpeak ſo
*Amiſs*, wrong
*A Miſs*, Miſtreſs
*Ant*, a Piſmire
*Aunt*, a Father's Siſter
*Anchor*, of a Ship
*Anker*, a Runlet
*A Peal*, of Bells
*Appeal*, to higher Powers
*A Roſe*, to ſmell to
*Aroſe*, did ariſe
*Are*, they be
*Air*, we breathe
*Heir*, to an Eſtate
*Arrant*, notorious
*Errand*, a Meſſage
*Arrows*, to ſhoot
*Arras*, Hangings
*Harraſs*, to fatigue
*A Scent*, or Smell
*Aſcent*, a going up
*Aſſent*, Agreement
*Aſſiſtance*, Help
*Aſſiſtants*, Helpers
*Augur*, a Soothſayer
*Augre*, to bore with
*Ax*, to cut with
*Acts*, of Parliament
*Auſtere*, ſevere
*Oyſter*, a Shell Fiſh

### B

*Babel*, the Tower
*Babble*, to prate
*Bacon*, Hogs Fleſh
*Baken*, in the Oven
*Beckon*, to make a Sign
*Beacon*, to be fired on a Hill
*Bail*, a Surety
*Bale*, of Goods
*Bald*, without Hair
*Bawl'd*, cried out
*Ball*, to play with
*Bawl*, to cry aloud
*Barbara*, a Woman's Name
*Barbary*, in Africa
*Barberry*, a Fruit
*Bare*, naked

*Bear*, a Beaſt, or to bear
*Bays*, of Bay-trees
*Baize*, Cloth of Colcheſter
*Baſe*, vile
*Baſs*, in Muſick
*Belly*, Part of the body
*Belie*, to ſpeak falſely
*Be*, they are
*Bee*, that makes Honey
*Beer*, to drink
*Bier*, to carry the Dead on
*Bell*, to ring
*Bel*, an Idol
*Berry*, a ſmall Fruit
*Bury*, the Dead
*Blue*, a Colour
*Blew*, as the Wind
*Board*, a Plank
*Bor'd* a Hole
*Boar*, a Beaſt
*Bore*, to make hollow
*Boor*, a Country Fellow
*Bold*, confident
*Bowl'd*, at the Jack
*Bolt*, the Door
*Boult*, the Meal
*Beau*, a Fop
*Bow*, to bend, or the Bow
*Bough*, of a Tree
*Boy*, a Lad
*Buoy*, of an Anchor
*Bread*, to eat
*Bred*, brought up
*Breeches*, to wear
*Breaches*, broken Places
*Bruit*, a Report
*Brute*, Beaſt
*Burrow*, for Rabbits
*Borough*, a Corporation
*By*, near
*Buy*, with Money
*Brews*, he breweth
*Bruiſe*, a Hurt
*Brewis*, of Fat and Bread
*Buſs*, a fiſhing Veſſel
*Buz*, the Noiſe of a fly

## C

*Cain*, that killed his Brother
*Cane*, to walk with
*Caen*, in Normandy
*Calais*, in France
*Chalice*, a Cup
*Call*, by Name
*Cawl*, or Suet
*Cannon*, a great Gun
*Canon*, a Rule
*Canon*, of a Cathedral
*Capital*, great or chief
*Capitol*, a Tower in Rome
*Career*, full Speed
*Carrier*, of Goods
*Cellar*, for Liquors
*Seller*, that ſelleth
*Cenſer*, for Incenſe
*Cenſor*, a Reformer
*Cenſure*, to judge
*Centaury*, an Herb
*Century*, an Hundred Years
*Sentry*, a Sentinel, a Soldier on Guard
*Char*, a Fiſh
*Chair*, to ſit on
*Chare*, a Job of Work
*Champaine*, Wine of *France*
*Champaign*, a wide Field or Summer's Expedition
*Choler*, Rage or Anger
*Collar*, of the Neck
*Coller*, of Beef or Brawn
*Cieling*, of a Room
*Sealing*, with a Seal
*Cittern*, for Muſick
*Citron*, a Fruit
*Choir*, of a Cathedral
*Quire*, of paper

*Clauſe*, Part of a Sentence
*Claws*, of a Beaſt or Bird
*Coat*, a Garment
*Cote*, for Sheep
*Comb*, for the Hair
*Come*, hither
*Commit*, to do
*Comet*, a blazing Star
*Common*, uſual
*Commune*, to converſe
*Condemn*, to Death
*Contemn*, to deſpiſe
*Council*, of the King
*Counſel*, Advice
*Coarſe*, not fine
*Courſe*, to be run
*Cornhill*, a Street in *London*
*Cornwall*, a County
*Cou'd* or could
*Cud*, to chew as Beaſts
*Current* a paſſing or running Stream
*Courant*, a Meſſenger or News-paper
*Currants*, Fruit
*Crick*, in the Neck
*Creek*, of the Sea or River
*Couſin*, a Relation
*Couzen*, to cheat
*Cymbal*, a Muſical Inſtrument
*Symbol*, a Mark or Sign
*Cypreſs*, a Tree
*Cyprus*, an Iſland
*Cruſe*, for Oil
*Cruiſe*, by the Sea-coaſt
*Cygnet*, a young Swan
*Signet*, a Seal

### D

*Dane*, of *Denmark*
*Deign*, to vouchſafe
*Dam*, ſtopping Water
*Damn*, to condemn
*Dame*, a Miſtreſs
*Dear*, of Price
*Deer*, in a Park
*Deceaſed*, dead
*Diſeaſed*, ſick
*Decent*, becoming
*Deſcent*, going down
*Diſſent*, to diſagree
*Deep*, low in Earth
*Dieppe*, a Town in *France*
*Defer*, to put off
*Differ*, to diſagree
*Derbe*, a City of *Aſia*
*Derby*, a Town in England
*Deſert*, Merit
*Deſart*, Wilderneſs
*Dew*, a falling Miſt
*Due*, owing
*Do*, to make
*Doe*, a Female Deer
*Dough*, Paſte
*Don*, a *Spaniſh* Lord
*Done*, acted
*Dun*, of Colour
*Dolphin*, a Fiſh
*Dauphine*, (formerly) the French King's eldeſt Son
*Devices*, Inventions
*Devizes*, a Town in *Wiltſhire*
*Doer*, that doeth
*Door*, of a Houſe
*Dragon*, a Beaſt
*Dragoon*, a Soldier
*Draught*, of Drink
*Drought*, Dryneſs
*Dolour*, Grief or Pain
*Dollar*, a Piece of Money
*Demure*, ſober
*Demur*, a Stop or Doubt

### E

*Ear*, of the Head
*E'er*, ever
*Year*, twelve Months
*Yearly*, every Year

*Early*, betimes
*Earth*, the Ground
*Hearth*, of the Chimney
*Eaſter*, the Feſtival
*Eſther*, a Woman's Name
*Enter*, to go in
*Inter*, to bury
*Elder*, not the Younger
*Elder*, a Tree
*Eaten*, or ſwallowed
*Eaton*, a Town's Name
*Eminent*, famous
*Imminent*, over Head
*Enow*, in Number
*Enough*, in Quantity
*Earn*, to deſerve
*Yarn*, Woollen-Thread
*Yearn*, to pity
*Eaſt*, the Wind
*Yeaſt*, uſed in making Bread
*Envy*, or Hatred
*Envoy*, a Meſſenger
*Exerciſe*, Labour or Practice
*Exorciſe*, to conjure
*Err*, to miſtake
*Er*, Brother to *Onan*, Son of *Judah*
*Extant*, in being
*Extent*, Diſtance

F

*Fain*, deſirous
*Feign*, to diſſemble
*Fair*, beautiful or a Market
*Fare*, Victuals
*Faint*, weary
*Faint*, a Pretence
*Fourth*, in Number
*Forth*, to go out
*Feed*, to eat
*Fee'd*, rewarded
*Fir*, Wood
*Fur*, or Hair
*Felon*, a Criminal
*Fellon*, a Whitlow
*File*, of Steel
*Foil*, put to the worſt
*Fly*, as a Bird
*Fly*, an Inſect
*Fillip*, with the Fingers
*Philip*, a Man's Name
*Flower*, of the Field
*Flour*, Meal
*Floor*, of a Room
*Follow*, to come after
*Fallow*, Ground not plough'd
*Find*, to find any Thing
*Fin'd*, amerced
*Fiend*, Devil
*Flea*, off the Skin, and alſo a Vermin
*Flee*, to eſcape
*Flue*, of a Chimney
*Flew*, did fly
*Fowl*, a Bird
*Foul*, dirty
*Francis*, a Man's Name
*Frances*, a Woman's Name
*Frays*, Quarrels
*Fraiſe*, Pancake with Bacon
*Frize*, a Sort of Cloth
*Freeze*, with Cold

G

*Gall*, of a Beaſt
*Gaul*, France
*Garden*, of Herbs
*Guardian*, an Overſeer
*Genteel*, graceful
*Gentile*, a Heathen
*Gentle*, mild
*Geſture*, Carriage
*Jeſter*, a merry Fellow
*Groan*, with Grief
*Grown*, greater
*Guilt*, of Sin
*Gilt*, with Gold

*Greater*, bigger
*Grater*, for Nutmegs
*Grave*, for the Dead
*Greave*, Armour for the Leg
*Gueſs*, to imagine
*Gueſt*, one entertained
*Gluttonous*, greedy
*Glutinous*, ſticking as Pitch
*Great*, large
*Grate*, for Coals, *&c.*
*Greet*, to ſalute
*Graze*, to eat Graſs
*Grays*, a Town
*Groat*, Four-pence
*Grot*, a Cave
*Gallies*, Ships with Oars
*Gallows*, for Criminals

## H

*Hare*, in the Field
*Hair*, of the Head
*Heir*, to an Eſtate
*Harſh*, ſevere
*Haſh*, minced Meat
*Haven*, a Harbour
*Heaven*, a place of Happineſs
*Heart*, of the Body
*Hart*, in the Woods, or an over-grown Buck
*Herd*, of Cattle
*Heard*, did hear
*Hard*, not ſoft, or difficult
*Here*, in this Place
*Hear*, with the Ears
*High*, lofty
*Hie*, away, make haſte
*Hoy*, a ſmall Ship
*Him*, that Man
*Hymn*, a ſpiritual Song
*Hail*, congealed Rain
*Hale*, the Ship
*Hall*, in the Houſe
*Haul*, pull
*Heel*, of the Foot
*Heal*, to cure
*He'll*, he will
*Higher*, taller
*Hire*, Wages
*His*, of him
*Hiſs*, as a Snake, or to deride
*Hoar*, a Froſt
*Whore*, a lewd Woman
*Hole*, or Hollowneſs
*Whole*, entire
*Ho! lo!* to call
*Hallow*, to make holy
*Hollow*, having a Cavity
*Holy*, pious
*Wholly*, entirely
*Holly*, a Tree
*Home*, one's Houſe
*Whom?* What Man?
*Holm*, Holly
*Hoop*, for a Tub
*Whoop*, or ho! lo!
*Hugh*, a Man's Name
*Hue*, of Colour
*Hew*, with an Ax

## I

*I*, I myſelf
*Eye*, to ſee with
*Idle*, lazy
*Idol*, an Image
*I'll*, I will
*Ayle*, of a Church
*Iſle*, an Iſland
Oil, of Olives
*Employ*, in Work
*Imply*, to ſignify
*In*, within
*Inn*, for Travellers
*Incite*, to ſtir up
*Inſight*, Knowledge
*Ingenious*, of quick Parts
*Ingenuous*, candid
*Iron*, Metal

*Irony*, ſpeaking by contraries
*Itch*, a Diſtemper
*Hitch*, to catch hold

K

*Ketch*, a Ship
*Catch*, to lay hold of
*Kill*, to ſlay
*Kiln*, for Lime
*Kind*, good-natured
*Coin'd* Money
*Knave*, diſhoneſt
*Nave*, of a Wheel
*Knight*, by Honour
*Night*, Darkneſs
*Kennel*, for Dogs
*Channel*, for Water

L

*Laid*, placed
*Lade*, the Water
*Lane*, a narrow Street
*Lain*, did lie
*Latin*, a Language
*Latten*, Tin
*Ladder*, to aſcend
*Lather*, made with Soap
*Lattice*, of a Window
*Lettice*, a Woman's Name
*Lettuce*, a Sallad
*Leaſe*, of a Houſe
*Leaſh*, Three
*Lees*, of Wine
*Leeſe*, an old Word for loſe
*Leaper*, that jumpeth
*Leper*, one leprous
*Leſſen*, to make leſs
*Leſſon*, to be read
*Leaſt*, ſmalleſt
*Leſt*, for fear
*Lethargy*, Sleepineſs
*Liturgy*, Church Service
*Lier*, in wait
*Liar*, that tells Lies
*Limb*, a Member
*Limn*, to paint
*Line*, Length
*Loin*, of Veal
*Liquoriſh*, fond of Dainties
*Liquorice*, a plant, or its Root
*Low*, humble
*Lo!* behold
*Loſe*, to ſuffer Loſs
*Looſe*, to let go
*Lower*, to let down
*Lour*, a Frown
*Loathe*, to abhor
*Loth*, unwilling

M

*Made*, finiſhed
*Maid*, a young Woman
*Main*, Chief
*Mane*, of a Horſe
*Male*, the He
*Mail*, Armour
*Manner*, Cuſtom
*Manor*, a Lordſhip
*Manure*, Dung
*Market*, to buy or ſell in
*Marked*, noted
*Marſh*, low Ground
*Maſh*, for a Horſe
*Meſh*, of a Net
*Martin*, a Man's Name
*Marten*, a Bird
*Mead*, a Meadow
*Mede*, one of *Media*
*Mean*, of low Value
*Mien*, Carriage or Aſpect
*Meat*, to eat
*Meet*, fit
*Mete*, to meaſure
*Meſſage*, Buſineſs
*Meſſuage*, a Houſe
*Mews*, for Hawks
*Muſe*, to meditate
*Mighty*, powerful
*Moiety*, Half

*Mile*, Meaſure
*Moil*, Labour
*Might*, Strength
*Mite*, in Cheeſe
*Moat*, a Ditch
*Mote*, in the Sun
*Moan*, [illegible] lament
*Mown*, cut down
*More*, in Quantity
*Moor*, a Black
*Mower*, that moweth
*Moor*, barren Ground
*Morter*, made of Lime
*Mortar*, to pound in
*Mole*, a Vermin
*Mould*, to caſt in
*Muſcle*, a Shell fiſh
*Muzzle*, to cover the Mouth

### N

*Nay*, Denial
*Neigh*, as a Horſe
*Neither*, none of the two
*Nether*, lower
*New*, not old
*Knew*, did know
*Naught*, bad
*Nought*, nothing
*Nigh*, near
*Nye*, a Man's Name
*Nice*, curious
*Niece*, a Brother's Daughter
*Not*, denying
*Knot*, to tie
*Note*, Mark
*Note*, of one's Hand
*Noſe*, of the Face
*Knows*, underſtands
*No*, Denial
*Know*, to underſtand
*Neal*, to harden Glaſs
*Kneel*, on the Knees
*None*, not one
*Known*, underſtood
*News*, Tidings
*Nooſe*, a Snare

### O

*Oar*, of a Boat
*Ore*, crude Metal
*O'er*, over
*Off*, caſt off
*Of*, belonging to
*Our*, belonging to us
*Hour*, of the Day
*Oh!* alas!
*Owe*, in Debt
*One*, in Number
*Won*, at Play
*Own*, to acknowledge
*Order*, Rule
*Ordure*, Dung

### P

*Pair*, a Couple
*Pare*, cut off
*Pear*, a Fruit
*Pain*, Anguiſh
*Pane*, of Glaſs
*Patten*, for a Woman
*Patent*, a Grant
*Peer*, a Lord
*Pier*, of *Dover*
*Peter*, a Man's Name
*Petre*, Salt
*Pail*, for Water
*Pale*, of Countenance
*Pale*, a Fence
*Pall*, for a Funeral
*Paul*, a Man's Name
*Plait*, the Hair
*Plate*, Metal
*Place*, Room
*Plaiſe*, a Fiſh
*Parſon*, of the Pariſh
*Perſon*, any Man
*Pole*, for Hops
*Pole*, of the Head
*Pool*, of Water

*Pore*, with the Eyes, or of the Skin
*Poor*, neceſſitous
*Palate*, of the Mouth
*Pallet*, Bed
*Palliate*, to cover or hide
*Point*, a Stop
*Pint*, Half a Quart
*Poſy*, a Noſegay
*Poeſy*, Poetry
*Power*, Might
*Pour*, as Water
*Prey*, a Booty
*Pray*, to beſeech
*Profit*, Gain
*Prophet*, a Foreteller
*Prophecy* a Foretelling
*Propheſy*, to foretel
*Practice*, Exerciſe
*Practiſe*, to exerciſe
*Preſence*, being here
*Preſents*, Gifts
*Prince*, the King's Son
*Prints*, Drawings
*Pleaſe*, to content
*Pleas*, Excuſes or Defences
*Precedent*, an Example
*Preſident*, Chief
*Principal*, Chief
*Principle*, the firſt Rule

Q

*Quire*, of Paper
*Choir*, of Singers
*Queen*, the King's Wife
*Quean*, a Harlot

R

*Rack*, to torment
*Wreck*, of a Ship
*Arrack*, a ſtrong Liquor
*Rain*, Water
*Reign*, of the King
*Rein*, of a Bridle
*Rays*, of the Sun
*Raiſe*, lift up
*Raiſin*, a Fruit
*Reaſon*, Argument
*Race*, to run
*Raſe*, to demoliſh
*Rice*, Grain
*Riſe*, to get up
*Read*, the Book
*Reed*, growing in the Water
*Relic*, a Remainder
*Relict*, a Widow
*Roe*, of a Fiſh, or Deer
*Row*, the Boat
*Right*, not wrong
*Rite*, a Ceremony
*Write*, with a Pen
*Wright*, a Wheelwright
*Reddiſh*, Colour
*Radiſh*, a Root
*Rear*, ſet up
*Rear*, behind
*Arrear*, of Rent
*Reſt*, Quiet
*Wreſt*, to prevent
*Roof*, the Top of an Houſe
*Ruff*, for the Neck
*Rough*, not ſmooth
*Rie*, Corn
*Rye*, a Town in *Suſſex*
*Wry*, crooked
*Ring*, the Bells
*Wring*, the Hands
*Rime*, a Fog or Miſt
*Rhyme*, Verſe
*Rode*, did ride
*Road*, the Highway
*Row'd*, did row
*Room*, Part of a Houſe
*Rome*, the Name of a City
*Roam*, to wander
*Rheum*, a Humour

*Rote*, got by Heart
*Wrote*, did write
*Wrought*, did work

### S

*Salary*, Wages
*Celery*, an Herb
*Savour*, Taſte or Smell
*Saviour*, that ſaves
*Satiety*, Fulneſs
*Society*, Company
*Sheep*, a Beaſt
*Ship*, for the Sea
*Sight*, View
*Cite*, to ſummons
*Site*, Situation
*Sail*, of a Ship
*Sale*, of Goods
*Sea*, the Ocean
*See*, with the Eyes
*Seam*, in a Coat
*Seem*, appear
*Seen*, beheld
*Scene*, in a play
*Seas*, great Waters
*Seize*, to lay hold of
*Ceaſe*, to leave off
*Sent*, did ſend
*Scent*, a Smell
*Shew*, to make appear
*Shoe*, for the Foot
*Sink*, ſink down
*Cinque*, five
*Slight*, to deſpiſe
*Sleight*, of Hand
*Shoar*, a Prop
*Shore*, the Sea Coaſt
*Sewer*, a common Drain
*Shown*, view'd
*Shone*, did ſhine
*Slow*, not quick
*Sloe*, Fruit
*Sew*, with a Needle
*Sue*, at Law
*Sow*, Seed
*So*, thus
*Some*, a Part
*Sum*, of Money
*Soul*, or Spirit
*Sole*, a Fiſh
*Soal*, of a Shoe
*Son*, of a Father
*Sun*, in the Firmament
*Sore*, painful
*Soar*, aloft
*Swore*, did ſwear
*Sword*, a weapon
*Soar'd*, did ſoar
*Stare*, to look earneſtly at
*Stair*, a Step
*Stile*, to get over
*Style*, of Writing
*Sound*, whole, firm; alſo Noiſe
*Swoon*, to faint away
*Soon*, quickly
*Statue*, an Image
*Statute*, a Law
*Stature*, Height
*Stead*, in Place
*Steed*, a Horſe
*Straight*, not crooked
*Strait*, narrow
*Succour*, Help
*Sucker*, a Young Sprig
*Spear*, a Weapon
*Sphere*, a Globe

### T

*Then*, at that Time
*Than*, in compariſon
*Tame*, gentle, not wild
*Thame*, a Town in *Oxfordſhire*
*Tear*, to rend
*Tear*, of the Eye
*Tare*, an Allowance in weight
*Tare*, Vetch
*Tail*, of a Beaſt

| | |
|---|---|
| *Tale*, | a Story |
| *Tiles*, | for the Houſe |
| *Toyles*, | Nets |
| *Toil*, | to labour |
| *There*, | in that Place |
| *Their*, | of them |
| *Through*, | compleat |
| *Throw*, | a Stone |
| *Throne*, | of the King |
| *Thrown*, | as a Stone |
| *Tide*, | a flowing water |
| *Ty'd*, | made faſt |
| *Time*, | of the Day |
| *Thyme*, | an Herb |
| *Team*, | of Horſes |
| *Teem*, | with Child |
| *To*, | the Prepoſition |
| *Toe*, | of the Foot |
| *Tow*, | to be ſpun, to draw |
| *Too*, | likewiſe |
| *Two*, | a Couple |
| *Told*, | as a Story |
| *Toll'd*, | as a Bell |
| *Tour*, | a Journey |
| *Tower*, | of a Church |

V

| | |
|---|---|
| *Vocation*, | Leiſure |
| *Vocation*, | a Calling |
| *Veil*, | a Covering |
| *Vale*, | between two Hills |
| *Vain*, | fooliſh |
| *Vein*, | of the Body |
| *Vane*, | a Weathercock |
| *Value*, | Worth |
| *Valley*, | a Vale |
| *Vial*, | a Glaſs |
| *Viol*, | a Fiddle |

U

| | |
|---|---|
| *Your*, | of you |
| *Ewer*, | a Baſon |
| *Uſe*, | Practice |
| *Uſe*, | to be wont |
| *Ewes*, | Sheep |

W

| | |
|---|---|
| *Wages*, | pay for ſervice |
| *Wagers*, | Betts |
| *Wade*, | in the Water |
| *Weigh'd*, | in the Scales |
| *Whale*, | of the Sea |
| *Wail*, | lament |
| *Waiſt*, | the Middle |
| *Waſte*, | to ſpend |
| *Wait*, | to ſtay for |
| *Weight*, | Heavineſs |
| *Wear*, | Clothes |
| *Ware*, | Merchandize |
| *Were*, | was |
| *Where*, | what Place |
| *Weighed*, | to poiſe |
| *Wey*, | five quarters |
| *Whey*, | of Milk |
| *Weal*, | good |
| *Wheal*, | from Scourging |
| *Wield*, | a Sword |
| *Weald*, | of *Suſſex*, or *Kent* |
| *Wen*, | in the Neck |
| *When*, | at what Time |
| *White*, | of Colour |
| *Wight*, | an Iſland |
| *Whore*, | a lewd Woman |
| *Hoar*, | Froſt |
| *Witch*, | that conjures |
| *Which*, | who or what |
| *Whiſt*, | Silence |
| *Wiſt*, | knew |
| *Won*, | did win |
| *One*, | the firſt Number |
| *Wood*, | of Trees |
| *Wou'd*, | or would |

Y

| | |
|---|---|
| *Yea*, | yes |
| *Ye*, | yourſelves |
| *Yew*, | a Tree |
| *You*, | yourſelves |
| *Yarn*, | made of Wool |
| *Yearn*, | to pity |

OF

## OF STOPS, MARKS, AND POINTS, USED IN READING AND WRITING; WITH THEIR PLACES AND SIGNIFICATIONS.

THESE are of abſolute Neceſſity; and great Regard ought to be had to them, to avoid Confuſion and Miſconſtruction, and for the better underſtanding of what we read and write ourſelves; and are likewiſe of uſe to others who ſhall hear us read, or ſee our Writing: They teach us to obſerve proper Diſtances of Time, with the neceſſary raiſing and falling of the Tone or Voice in Reading, and the needful Stops or Marks to be uſed in Writing, that we may underſtand it ourſelves, and that our Meaning may not be miſunderſtood or miſapplied by others.

Stops, or Pauſes, conſidered as Intervals in Reading, are no more than four; though there are other Marks to be taken Notice of, but to other Purpoſes: The Names of the four Stops are, a *Comma, Semicolon, Colon,* and *Period,* or *Full Stop*; and theſe do bear to one another a kind of progreſſional Proportion of Time; for the *Comma* ſignifies a Stop of leaſurely telling one, the *Semicolon* two, the *Colon* three, and the *Period* four—And are made or marked thus:

*Comma,* (,) at the Foot of a Word.
*Semicolon,* (;) a point over the Comma.
*Colon* (:) two Points
*Period* (.) a ſingle Point at the Foot of a Word.

, *Example of the* Comma (,) There is not any thing in the World, perhaps, that is more talked of, and leſs underſtood, than the Buſineſs of a happy Life.

; *Example of a* Semicolon. It is not a Curſe that makes way for a Bleſſing; the bare wiſh is an Injury; the Moderation of *Antigonus* was remarkable.

: *Example of the* Colon (:) A ſound Mind is not to be ſhaken with popular Applauſe: but Anger is ſtartled at every Accident.

. *Example of the* Period (.) It is a Shame, ſays *Fabius*, for a Commander to excuſe himſelf, by ſaying, I was not aware of it. A Cruelty that was only fit for *Marius* to ſuffer, *Sylla* to command, and *Catiline* to act.

By the Examples foregoing, we may eaſily note, that a *Comma* is a Note of a ſhort Stay between Words in the

Sentence; and therefore the Tenor of the Voice muſt ſtill be kept up.—The *Semicolon* is a little longer, and the Tone of the Voice very little abated.—The *Colon* ſignifies perfect Senſe, though not the End of the Sentence; and the Voice a little abated, or let fall.—The *Period* denotes perfect Senſe, and the End of the Sentence.

? When the Queſtion is aſked, there is a crooked Mark made over the Period, thus ? and is called a Note of Interrogation. *Example,* What could be happier than the State of Mankind, when People lived without either Avarice or Envy? The Time of Pauſe for this Stop is the ſame with the *Semicolon.*

! If a ſudden Crying-out, or Wondering be expreſſed, then this Mark is made over the Full Stop, thus ! and called a Note of Admiration, or Exclamation. *Example,* Oh the aſtoniſhing Wonders that are in the elementary World!

( ) If one Sentence be within another, of which it is no Part, then it is placed between two Semicircles or Parentheſes, made thus ( ), *Example, Pompey* on the other ſide (that hardly ever ſpake in public, without a Bluſh) had a wonderful Sweetneſs of Nature. Again: Of Authors be ſure to make Choice of the beſt, and (as I ſaid before) to ſtick cloſe to them. Once more: Honour thy Father and Mother (which is the firſt Commandment with Promiſe) that it may be well with thee. In reading a Parentheſis, the Tone muſt be ſomewhat lower, as a Thing or matter that comes in by the bye, breaking in as it were on the main Coherence of the Period. The Time is equal to a Comma, and ought to be read pretty quick, leſt it detain the Ear too long from the Senſe of the more important Matter.

' *Apoſtrophe,* is a Comma at the Head of Letters, ſignifying ſome Letter or Letters left out for quicker Pronunciation, as *I'll* for *I will, would'ſt* for *wouldeſt, ſha'nt* for *ſhall not, ne'er* for *never, is't* for *is it, 'tis* for *it is, i'th'* for *in the, o'er* for *over.* Or to denote a Genitive Caſe; as my Father's Houſe, my Uncle's Wife, *&c.*

´ *Accent* is placed over a Vowel, to denote that the Streſs or Sound in Pronunciation is on that Syllable.

˘ *Breve,* or crooked mark over a Vowel, ſignifies it muſt be ſounded ſhort or quick.

‸ *Caret* ſignifies ſomething is wanting, and is placed underneath the Line, juſt where any thing omitted by Miſtake or Forgetfulneſs, &c. ſhould be brought in.

^ *Circumflex* is of the ſame ſhape with a Caret, but is placed over ſome Vowel, to ſhew the ſyllable to be long, as *Eu-phrâ-tes*.

¨ *Diæreſis*, two points placed over Vowels, to ſignify they are parted, being no Diphthong.

- *Hyphen* or *Note of Connection*, is a ſtrait Line; which being ſet at the end of a Line; ſhews that the Syllables of that word are parted, and the Remainder of it is at the Beginning of the next Line; and ſometimes is uſed in Compound Words, as Burnt-ſacrifices, Heart-breaking, Soul-healing, Book-keeper, &c. *N. B.* That when you have not Room to write the whole Word at the end of a Line, but are obliged to finiſh it at the Beginning of the next, ſuch Words muſt be truly divided, according to the Rules of Spelling; re to re-ſtrain, not——————reſ-train. When the Hyphen is placed over a Vowel, it is properly a Daſh, and ſignifies the Omiſſion of *m* or *n*; 'tis much uſed in old *Latin* Authors, and ſometimes in *Engliſh* eſpecially in Law Buſineſs, *Example*; it is very comedable to write a good Hand.

☞ *Index* is a Note like a Hand, pointing to ſomething very remarkable.

* *Aſteriſm* or *Star*, directs to ſome Remark in the Margin, or at the Foot of the Page. Several of them together to denote ſomething defective or immodeſt in that paſſage of the Author.

† *Obeliſk* is a Mark like a Dagger, and refers to the Margin, as the *Aſteriſm*: And in Dictionaries it ſignifies the Word to be obſolete, or old, and out of Uſe.

¶ *Paragraph* denotes a Diviſion, comprehending ſeveral Sentences under one Head.

§ *Section* ſignifies the Beginning of a new head Diſcourſe, and it is uſed in ſubdividing a Chapter, or Book, into leſſer Parts or Proportions.

[ ] *Brackets* or *Crotchets*, generally include a Word or Sentence, explanatory of what went before; or words of the ſame Senſe, which may be uſed in their ſtead.

" *Quotation*, or double Comma reverſed, is uſed at the Beginning of the Line, and ſhews what is quoted from an Author to be his own Words.

Thus much for pointing, Stops, and Marks, which, if carefully heeded and obſerved, will add Grace and Credit to your Writing.

## OF ABBREVIATIONS.

TO be ready in theſe ſhews a Dexterity in Writing; and is very neceſſary for Diſpatch; for by theſe we expeditiouſly expreſs, or ſet down a Word, ſhortening it by making ſome initial Letter or Letters, belonging to the Word, to expreſs it, as in the Table following:

*A.* for Anſwer, or Afternoon
*A. B.* Bachelor of Arts
*A. Bp.* Archbiſhop
*Acc.* Account
*A. D.* Anno Domini, Year of our Lord
*A. M.* Anno Mundi, Year of the World
*Adm*$^{rs}$. Adminiſtrators
*A. M.* Artium Magiſter, Maſter of Arts
*Ana,* of each a like Quantity
*Ap.* April or Apoſtle
*Adm*$^{l}$. Admiral
*Ag*$^{t}$. Againſt
*Am*$^{t}$. Amount
*Aug.* Auguſt
*A. R.* Anno Regni, in the Year of the Reign
*Aſt. P. G.* Aſtronomy Profeſſor at Greſham College
*B. A.* Bachelor of Arts
*B. D.* Bachelor of Divinity
*B. V.* Bleſſed Virgin
*Bar*$^{t}$. Baronet
*Bp.* Biſhop
*Cant.* Canticles, or Canterbury
*Cha.* Charles
*Chap.* Chapter
*Cent.* Centum
*Chan.* Chancellor
*Chron.* Chronicles
*Capt.* Captain
*Col.* Coloſſians
*Cl.* Clericus
*Col.* Colonel
*Com*$^{rs}$. Commiſſioners
*Conf*$^{r}$. Confeſſor
*Cor.* Corinthians or Corollary
*Cr.* Creditor
*C. R.* Carolus Rex, or Charles the King
*C. C. C.* Corpus Chriſti College
*C. S.* Cuſtos Sigilli, Keeper of the Seal
*C. P. S.* Cuſtos Privati Sigilli, Keeper of the Privy Seal
*D.* Dean or Duke
*Dan.* Daniel
*Dr.* Doctor or Debtor
*D*$^{o}$. Ditto or the ſame
*D.* Denarii, Pence
*Dec.* or *xber,* or 10*ber,* December
*Deut.* Deuteronomy
*Dec.* Deceaſed
*D. D.* Doctor of Divinity
*E.* Earl
*Earld.* Earldom
*Edm.* Edmund
*Ex. gr.* or *eg.* Exempli gratia. for Example
*Eph.* Epheſians
*Eccl.* Eccleſiaſtes
*Ex.* Exodus or Example
*Eſq.* Eſquire
*Exon,* Exeter
*Feb.* February
*Fra.* Francis or Frances
*F.R.S.* Fellow of the Royal Society

*Gal.* Galatians
*Gen.* Geneſis
Gen$^{mo}$. Generaliſſimo
*Geo.* George
*G. R.* George Rex, George the King
*Gen.* General
*Gent.* Gentleman
*Heb.* Hebrews
*i. e.* Id eſt, that is
*I.H.S.* Jeſu Hominum Salvator, Jeſus Saviour of Men
*Ib.* Ibidem in the ſame Place
*Id.* Idem, the ſame
*Inſt.* Inſtance, or Inſtant
*Jan.* January
*Jer.* Jeremiah
*Jud.* Judges
*J. D.* Jurium Doctor, Doctor of Laws
*Joſ.* Joſhua
*K.* King
K$^{m}$ Kingdom
K$^{nt}$. Knight
*L.* Lord
*l.* Liber, a Book
*L.* Libræ, Pounds
*Lieut.* Lieutenant
*Lp.* Lordſhip
*Ladyſh*$^{p}$. Ladyſhip
*L. L. D.* Legum Doctor, Doctor of Laws
*Lam.* Lamentations
*Lev.* Leviticus
*L. C. J.* Lord Chief Juſtice
*M.* Marquis, or Monday, or Morning
*Mar.* March
*Mat.* Matthew
*m. Manipulus,* a Handful
*M. A.* Maſter of Arts
*Monſ.* Monſieur
*Mr.* Maſter
*Mrs.* Miſtreſs
*M. D.* Medicinæ Doctor, Doctor of Phyſic
*M. S.* Memoriæ Sacrum, Sacred to the Memory
*MS.* Manuſcript
*MSS.* Manuſcripts
*Mich.* Michael, or Michaelmas
*Min.* Miniſter
*N. B.* Nota Bene, Note, or mark well
*N. S.* New Stile
*N*$^{o}$. Number
*n. l.* Non liquet, it appears not
*Nov.* or *9ber,* November
*Ob*$^{t}$. Obedient
*O. S.* Old Style
*Oct.* or *8ber,* October
*Oxon,* Oxford
*Pugil,* a Handful
*P*$^{d}$. Paid
*Per C.* Per Centum, by the Hundred
*Parl.* Parliament
*Philo Math.* Philo Mathematicus, a Lover of the Mathematics
*P.M.G.* Profeſſor of Muſic at Greſham College
*Prof. Th. G.* Profeſſor of Divinity at Greſham College
*Pſ.* Pſalm
*P.S.* Poſtcript
*Penult.* laſt ſave one
*Q.* Queen, Query, or Queſtion
*q.* quaſi, as it were
*q. d.* quaſi dicat, as if he ſhould ſay
*q. l.* quantum libet, as much as you pleaſe
*q. ſ.* quantum ſufficit, a ſufficient Quantity
*qr.* Quarter or a Farthing.

*R*. Rex, King; or Regina, Queen
*Rev*. Reverend, or Revelation
*Reg*. *Prof*. Regius Profeſſor
*Rom*. Romans
*Rt*. *Hon*$^{ble}$. Right Honourable
*Rt*. *Worp*$^{l}$. Right Worſhipful
*St*. Saint, or Street
*Sect*. Section
*Sept*. or *7ber* September
*Serj*. Serjeant
*Serv*. Servant
*Salop*, Shropſhire
*ſſ*. Semiſſis, half a Pound
*S. S. T. P.* a Profeſſor, or Doctor of Divinity
*Theſſ*. Theſſalonians
*V*. Virgin, or Verſe
*Ult*. *Ultimus*, the laſt
*Vid*. ſee
*Viz*. Videlicet, to wit, or that is to ſay
*V. gr.* Verbi Gratia, for Example
*W. R.* William Rex
*w*$^{n}$. when
*X*$^{n}$. Chriſtian
*X*$^{t}$. Chriſt
*Xtopher*. Chriſtopher
*y*$^{e}$. the
*y*$^{n}$. then
*y*$^{m}$. them
*y*$^{t}$. that
*y*$^{r}$. your
&, et, and
&*c*. et cetera, and the reſt, or, and ſo forth

And now having finiſhed my Directions concerning Spelling, Pointing, &c. I ſhall proceed to give ſome Inſtructions in relation to the moſt uſeful Art of Writing.

Firſt, and principally, there muſt be a fixed Deſire and Inclination imprinted in the Mind for its Attainment: For I myſelf had never acquired or arrived to any Proficiency in it, if I had not had a ſtrong Deſire and Inclination to it; ariſing from being convinced of its excellent Uſe in Trade, and all Manner of Buſineſs.

## DIRECTIONS *to* BEGINNERS *in* WRITING.

FIRST, it is neceſſary to be provided with the following Implements, *viz.* good Pens, good and free Ink, and alſo good Paper, when arrived to commendable Performances; likewiſe a flat Ruler for Sureneſs; and a round one for Diſpatch; with a leaden Plummet or Pencil to rule lines: Alſo Gum Sandrick Powder (or Pounce, as they call it) with a little cotton dipped therein, which rub gently over the Paper to make it bear Ink the better; particularly when full Hands are to be written, ſuch as Text, &c. and eſpecially when you are obliged to ſcratch out a Word or Letter: for then there will be a neceſſity for its Uſe;

and rubbing the Place with the Pounce, ſmooth it with the Haft of the Penknife, or clean Paper, and there you may write what is proper in the ſame Place.

### *To hold the Pen.*

THE Pen muſt be held ſomewhat ſloping, with the Thumb and the two Fingers next to it; the Ball of the Middle-finger, muſt be placed ſtraight juſt againſt the upper Part of the Cut or Cradle to keep the Pen ſteady: The Fore-finger lying ſtraight on the Middle-finger; and the Thumb muſt be fixed a little higher than the end of the Fore-finger bending in the joint; and the Pen ſo placed as to be held eaſily without griping. The Elbow muſt be drawn towards the Body, but not too cloſe. You muſt ſupport your Hand by leaning on the Table-edge, reſting it half-way between your Wriſt and Elbow, not ſuffering the Ball or fleſhy Part of your Hand to touch the Paper; but reſting your Hand on the End of your Little-finger, that and your Fore-finger bending inwards, and ſupported on the Table as above ſaid. So fixed, and ſitting pretty upright, not leaning your Breaſt againſt the Table, proceed to the making the ſmall *a*, and *a*, *c*, *e*, *i*, *m*, *r*, *s*, *w*, and *x*; which muſt be all made of equal Bigneſs and Height; the Diſtance or Width between the two Strokes of the *n* muſt be the ſame with the Diſtance or Width in the three Strokes of the *m*; the ſame Proportion of Width muſt be obſerved in the *u*, *w* and *o*. The Letters with Stems, or Heads, muſt be of equal Height; as the *b*, *d*, *f*, *h*, *l*, and *ſ*. And thoſe with Tails muſt be of equal Depth, as the *f*, *g*, *p*, *q*, and *ſ*. The Capitals muſt bear the ſame Proportion to one another with reſpect to Bigneſs and Height, as *A*, *B*, *C*, *D*, *E*, *F*, *G*, *H*, and *I*, &c. —This Proportion of Letters, both of Small and Great, muſt be obſerved in, and will ſerve for all Hands whatſoever. N.B. That all upright Strokes, and thoſe leaning to the left Hand, muſt be fine, or Hair-Strokes, and all downright Strokes muſt be fuller or blacker. And when you are in Joining, where Letters will naturally join, without any ſtraining, take off your Pen in Writing, eſpecially in Running or Mixed Hand. Care likewiſe muſt be duly taken, that there be an equal Diſtance between Letter and Letter, and alſo between Word and Word: The Diſtance between Word and Word may be the Space the ſmall *m* takes up; but between Letter and Letter, not quite ſo much. Sit not long at writing, (that is not longer than you improve) eſpecially at the firſt, leſt it weary you, and you grow tired of learning. Imitate the beſt Examples; and have a conſtant eye at your Copy; and be not ambitious of writing faſt, before you can write well: Expedition will naturally follow, when you have gained a Habit of writing fair and free; and 'tis much more commendable to be an Hour in writing ſix Lines well, than to be able to write ſixty Lines in the ſame Time, which perhaps will be altogether unintelligible. And beſides, by a ſlow and fair Procedure you will learn in half the Time; and therefore 'tis a vain thought in a Learner to deſire to be quick before he hath acquired Experience, and a Freedom of Writing by frequent Practice. If you have Cotton in your Ink, look well that there be no Hairs at the Nib of your Pen. Never overcharge your Pen with Ink; but ſhake what is too much into the Ink again.

### *How to make a Pen.*

THIS is gained ſooner by Experience and Obſervation from others who can make a Pen well, than by verbal Directions. But *Note*, that thoſe Quills, called Seconds, are the beſt, as being hard, long, and round in the Barrel; and before you begin to cut the Quill, ſcrape off the ſuperfluous Scurf with the Back of your Penknife; ſcrape moſt on the Back of the Quill, that the Slit may be the finer, and without Gander's Teeth (as the Roughneſs in the Slit is by ſome called). After you have ſcraped the Quill as aforeſaid, cut the Quill at the End, half through, on the back Part, and then turning up the Belly, cut the other Part, or Half, quite through, *viz.* about a Quarter or almoſt half an Inch, at the End of the Quill, which will then appear forked: Then enter the Penknife a little in the back Notch, and then putting the Peg of the Penknife-haft (or the End of another Quill into the back Notch, holding your Thumb pretty Hard on the Back of the Quill as high as you intend the Slit to be) with a ſudden or quick Twitch, force up the Slit: it muſt be ſudden and ſmart, that the Slit may be clearer: Then by ſeveral Cuts on each Side bring the Quill into equal Shape or Form on both Sides; and having brought it to a fine Point, place the Inſide of the Nib on the Nail of your Thumb, and enter the

Knife at the Extremity of the Nib, and cut it through a little ſloping: Then with an almoſt downright Cut of the Knife, cut off the Nib; and then by other proper Cuts finiſh the Pen, bringing it into a handſome Shape, and proper Form, but meddle not with the Nib again, by giving it any Trimming or fine Cuts, for that cauſes a Roughneſs, and ſpoils it: but if you do, to bring the Nib the evener, you muſt nib it again, as above directed. ☞ *Note.* That the Breadth of the Nib muſt be proportioned to the Breadth of the Body, or downright back Strokes of the Letters, in whatever Hand you write, whether Small or Text. *Note alſo*, That in your ſitting to write, you place yourſelf directly againſt a fore-right Light, or elſe to have it on your left Hand (which I eſteem beſt) but by no Means to have the Light on the right Hand, becauſe the Shadow of your Writing-hand will obſtruct your Sight.

Thus far for Direction. Now for Application. I have here ſet Copies for the moſt uſeful, faſhionable, and commendable Hands for Buſineſs; with Alphabets of Great and Small Letters proper to each. Be ſure you make your Letters well (both Small and Great) before you proceed to Joining. Be careful in Imitation, and obſerve the foregoing Directions, and without doubt you will gain your End. Command of Hand, or Art of ſtriking Letters, &c. is gained by frequent practiſing after good Examples.

A B C D E F G H I J K L M N

O P Q R S T U V W X Y Z Æ

a b c d e f g h i j k l m n o p

q r ſ s t u v w x y z &

*Note,* 'Tis neceſſary for all thoſe who would qualify themſelves for Buſineſs, often to imitate this Print hand; to make clean marks on Bales, or Plain Directions on Parcels.

## *Copies in Alphabetical Order.*

### A

ART is gained by great Labour and Induſtry.
A covetous Man is always, as he fancies, in Want.
Add to your Faith Virtue, and to Virtue Knowledge.

### B

Beauty is commendable in ſome, but it ruins others.
By a commendable Deportment we gain Reputation.
By a Delight and ſome Care, we come to write fair.

### C

Contentment is preferable to Riches and Honour.
Can they be counted wiſe, who Counſel do deſpiſe?
Care mixed with Delight, will bring us ſoon to write.

### D

Deride not Infirmities, nor triumph over Injuries.
Delight and ſome Care, will make you write fair.
Delight in Virtue's Ways, and then you'll merit Praiſe.

### E

Endleſs Joys have thoſe, whoſe Sins are vanquiſh'd Foes.
Every Plant and Flower ſhews to us GOD's Power.
Example oft doth rule, the wiſe Man and the Fool.

### F

Fair Words are often uſed to hide foul Deeds.
Fair Faces have ſometimes foul Conditions.
Few do Good with what they have gotten ill.

### G

Godlineſs with Contentment is great Gain.
Good Manners in a Lad, will make his Parents glad.
Great Mind and ſmall Means ruin many Men.

### H

Haſty Reſolutions are ſeldom fortunate.
Haſte makes Waſte of Paper, Ink, and Time.
He that ſtumbles and falls not, mends his Pace.

### I

Inſtruction and a good Education are a durable Portion.
Ignorance is the greateſt Enemy to Learning.
In praiſing ſparing be, and blame moſt ſparingly.

### K

Keep a cloſe Mouth, if you'd have a wiſe Head.
Kings, as well as mean Men, muſt die.
Kings may command, and Subjects muſt obey.

### L

Learn to live as you would wiſh to die.
Love and Honour will bear no Rivals.

Learn to unlearn what you have learn'd amiſs.

M

Modeſty has more Charms than Beauty.
Monuments of Learning are moſt durable.
Make Uſe of Time, now whilſt you're in your Prime.

N

Nothing is conſtant in this uncertain World.
Neceſſity is commonly the Mother of Invention.
Next to a good Conſcience prefer a good Name.

O

Opportunity neglected, brings ſevere Repentance.
On preſent Time depends our future State.
Of all Prodigality, that of Time is the worſt.

P

Provide againſt the worſt, and hope for the beſt.
Poor Men want many Things, but covetous Men all.
Patience and Time run through the rougheſt Day.

Q

Quick Promiſers are commonly ſlow Performers.
Quietneſs and Content are Mates moſt excellent.
Qualify exorbitant Paſſions with Quietneſs and Patience.

R

Remember your Duty to God, your Neighbour and yourſelf.
Repentance comes too late when all is conſumed.
Reaſon ſhould always guide, and o'er our Acts preſide.

S

Sin and Sorrow are inſeparable Companions.
Self Love is the greateſt Flatterer in the World.
Some had rather diſcharge a Reckoning than pay a Debt.

T

Train up a Child in the Practice of Love and good Manners.
The End of Mirth is many Times the Beginning of Sorrow.
Time is ſo ſwift of Foot, that none can overtake it.

V

Vanity makes Beauty contemptible.
Vain and tranſitory is all worldly Glory.
Virtue and Fortune work Wonders in the World.

W

What is more vain than public Light to ſhun?
Wiſdom is more valuable than Riches.
What pleaſes God muſt be, none alters his Decree.

X

*Xenophon* was a great Captain as well as a Philoſopher.

*Xerxes* wept at the Thoughts that his vaſt Army would be dead in 100 Years.
*Xerxes* whipt the Sea becauſe it would not obey his Command.

## Y

Youth is full of Diſorder, and Age of Infirmity.
Young Men lament your Minutes miſpent.
Your Time improve, ſquander it not away.

## Z

Zeal in a good Cauſe, will merit Applauſe.
Zeal mixt with Love is harmleſs as a Dove.
Zealouſly ſtrive with Emulation to write.

### *Short Lines for Text Hand.*

Abandon whatſoever's ill—Be wiſe betimes.
Care deſtroys the Body—Do the Things that are juſt.
Expect to receive as you give—Frequent good Company.
Give what you give chearfully—Have good Men in Eſteem.
Imitate that which is good—Keep God's Commandments.
Learn to be wiſe—Make a right Uſe of Time.
Nothing get, Nothing have—Obſerve Modeſty.
Pleaſures are very ſhort—Pains are very long.
Quit all revenge—Quit your Paſſions.
Recompenſe a good Turn—Repent of your Sins.
Silence gives Conſent—Sin very little.
Time is more precious than Gold—Turn from your Sins.
Uſe moderate Pleaſure—Uſe not bad Company.
Vain are ſome Pleaſures—Vice is deteſtable.
Wiſdom is the principal Thing—Wiſe Men are ſcarce.
*Xenophon*, *Xenocrates*.
Yeſterday cannot be recalled—You cannot take too much Care.
*Zeho* and *Zenobia*.

Since good Ink is neceſſary to good Writing, I ſhall give a Receipt or two for making ſome of the beſt black Ink in the World, which is as follows, *viz.*

### *A Receipt for making black Ink.*

TO ſix Quarts of Rain or River Water, (but Rain Water is the beſt) put one Pound and a Half of freſh blue Galls of *Aleppo*, (for thoſe of *Smyrna* are not ſtrong enough) bruiſed pretty ſmall; eight Ounces of Copperas, clean, rocky, and green; alſo eight Ounces of clean, bright and clear Gum Arabic; and two Ounces of Roche Allum:

Let theſe ſtand together in a large Stone Bottle, or clean Stone Pot, or earthen Pot, with a narrow Mouth, to keep it free from Duſt; ſhake, roll, or ſtir it well, once every Day, and you will have excellent Ink in about a Month's Time, and the older it grows the better it will be for Uſe.

### *Ingredients for a Quart.*

One Quart of Water, four Ounces of Galls, two Ounces of Copperas, and two Ounces of Gum, mixed and ſtirred as above.

☞ If you ſoak the green Peeling of *Walnuts* (at the Time of Year when pretty ripe) and Oak Saw-duſt, or *ſmall* Chips of Oak, in Rain Water, and ſtir it pretty often for a Fortnight, the Water ſtrained off and uſed with the ſame Ingredients as above, will render the Ink *ſtill* ſtronger and better.

### *How to make Red Ink.*

TAKE three Pints of ſtale Beer (rather than Vinegar) and four Ounces of Ground *Brazil* Wood; ſimmer them together for an Hour; then ſtrain it through a Flannel, and bottle it up (well ſtopped) for Uſe.

Or you may diſſolve Half an Ounce of *Gum Senega,* or *Arabic,* in Half a Pint of Water; then put a Pennyworth of *Vermillion* into a ſmall Gallipot, and pour ſome of the Gum-water to it, ſtir it well, and mix it together with a Hair Pencil, to a proper Conſiſtency; but it will not incorporate preſently, though by the next Day it will; then having a clean Pen, dip it into the Ink, having firſt well ſtirred it with a Pencil, and then you may uſe it: It is a fine and curious Red, though not ſo free as the other. And after the ſame Manner, you may make any other coloured Ink as Blue, Green, Yellow, Purple, &c. having divers Gallipots for that Uſe. In like Manner you may mix the *Shell Gold* for curious Occaſions; pouring two or three Drops, according to the Direction, into the Shell, and mix it well with a clean Hair Pencil, and with it put a little into a clean Pen, &c. The ſmall Shells may be bought at ſome *Fan Sellers* or *Fan Painters,* at two or three for Two-pence; or the largeſt ones (which are the beſt) at the Colour Shops, at Six-pence a piece.

### *To keep Ink from Freezing or Moulding.*

IN hard froſty Weather, Ink will be apt to freeze; which, if once it doth, it will be good for nothing; it takes away all its Blackneſs and Beauty. To prevent which (if you have not a Conveniency of keeping it warm, or from the cold) put a few Drops of Brandy or other Spirits into it, and it will not freeze. And to hinder its moulding, put a little Salt therein.

## FAMILIAR LETTERS ON SEVERAL OCCASIONS, AND ON DIVERS SUBJECTS.

LETTERS are variouſly worded, and ought properly to expreſs the Deſires, Thoughts, &c. of the Writer to the Reader, and thereby the Receiver of the Letter may fully underſtand, and be juſtly informed of the Occaſions, Wants, or Intentions of the Sender.

I ſhall give ſundry Examples promiſcuouſly, as follow:

### *A Letter from a Son to his Father.*

*Hon. Father,*

AS I have not had a Letter from you ſince your Favour of the 8th of *October* laſt, which I anſwered by the next Poſt, I take this Opportunity of enquiring after your Health, and that of my Siſter. Pray give my Love to my Siſter, and be pleaſed to accept of my Duty to yourſelf, who am,

*Sir,*
*your moſt dutiful Son,*
*and humble Servant.*
Anthony Addlehill.

*London, Dec.* 6.
1798.

### *The Anſwer.*

*Dear Son,* *Pemſey, 28th Dec.* 1798.

I Received the Letter of the 6th Inſtant, and thank you for enquiring after my Health, which, I thank GOD, I perfectly enjoy at preſent, as I wiſh and hope you do. Your Siſter remembers her Love to you, and hath ſent you a Turkey and a Chine of Bacon, to which I wiſh you and your Friends (if you invite any) a good Stomach. My Prayers to God for your Proſperity, temporal and eternal, are conſtantly offered up by

*Your loving Father,*
Andrew Addlehill.

### *A Letter from a Niece to her Aunt.*

*Madam,*

THE Trouble I have already given you puts me to the Bluſh, when I think of intruding again on your Goodneſs; but Neceſſity, which frequently obliges us to ſuch Actions as are contrary to our Inclination, is the Motive that induces me to be thus troubleſome now. Pray, dear Madam, excuſe me, if I once more beg your Aſſiſtance, which I do not doubt but you very well know I ſtand greatly in Need of at this Time; and I ſhall ever have a greatful Remembrance of your Goodneſs to me; and I hope I ſhall be, one Time or other, in a Capacity of making ſome Return for the many Obligations your Goodneſs hath conferred upon me,

*London, May 6,* *Your moſt reſpectful Niece,*
1798. *and very humble Servant,*
Penelope Pinch.

### *A Letter of profered Aſſiſtance to a Friend.*

*Dear Friend,*

I SHOULD be falſe to true Friendſhip, if I ſhould neglect or caſt off my Friend in Adverſity; I have heard that you are under ſome Misfortune, and at preſent need my Aſſiſtance. I therefore ſend you theſe Lines for your Conſolation, deſiring you to bear up againſt your Ill-luck with as much Preſence of Mind as you can, for, aſſure yourſelf, I ſhall ſuddenly follow this Epiſtle in Perſon, and come, I hope, opportunely enough for your Aſſiſtance; 'till which Time take Courage, and be aſſured that you ſhall not be diſappointed of timely Help, from, dear Friend,

*Your's in Reality,*
Timothy Timely.

### *A Brother to a Siſter.*

*Dear Siſter,*

MY great Diſtance and long Abſence from you (tho' I have not wanted good Company) makes me very ſolicitous concerning your Welfare: Natural Affection inclines me ſtrongly to have you in Remembrance, tendering your Health and Welfare in every Reſpect, as dear as my own; and there is nothing at my Command, but, if you requeſt, it ſhall be freely yours. Notwithſtanding the Diſtance, I purpoſe (God willing) to make you a Viſit very ſhortly, and I had done it before now but an urgent Occaſion interpoſed, the Particulars of which, being too long for a Letter, I ſhall acquaint you with when I ſee you. Pray give my due Reſpects to all Friends, particularly to honeſt Mr. *S. T.* and ſo in Expectation of finding you all well at my Arrival, I conclude,

*London, May* 6, *Dear Siſter,*
1798. *Your Affectionate Brother,*
*and humble Servant,*
Henry Hearty.

*A Letter from a Youth at School to his Parents.*

*Honoured Father and Mother,*

I AM very much obliged to you for all your Favours; all I have to hope is, that the Progreſs I make in my Learning will be no diſagreeable Return for the ſame: Gratitude, Duty, and a View to future Advantages, all conſpire to make me fully ſenſible how much I ought to labour for my own Improvement, and your Satisfaction, in order to ſhew myſelf upon all Occaſions, to be

*Acton School, May* 8, *Your moſt obedient Son,*
1798. Daniel Diligent.

*A Letter of Recommendation.*

*SIR,*

THE Bearer hereof, *Francis Faithful,* I ſend to you as one whoſe Honeſty you may rely on; and my Experience of his Conduct and Fidelity gives me a certain Kind of Confidence in recommending him to you; for you know me, Sir, and I believe you cannot in the leaſt think, that I would recommend any one to you, of whoſe Probity I had the leaſt Shadow of Doubt or Suſpicion. I am, with due Reſpect,

May 6, 1798. *Sir, your real Friend,*
*and humble Servant,*
George Generous.

*A*

### *A Letter of Thanks.*

*SIR,*

I RECEIVED your Favour, with the kind Preſent which accompanied it: I have no other Way of expreſſing my Gratitude at preſent, than by my hearty Thanks; every Thing you do has a peculiar Excellence, and the Manner of doing it as agreeable as the Action itſelf; but I muſt ſtop, leſt I ſhould offend that Delicacy, which I would commend, and which is conſtantly admired by,

*May* 10, 1798. *Sir, your moſt obliged and*
*moſt humble Servant,*
George Grateful.

### *A Letter of Congratulation.*

*SIR,*

AS I am perfectly ſincere in the Profeſſions of Friendſhip which I have conſtantly made to you, you will certainly believe that I am ſenſibly rejoiced at your late good Fortune; I heartily wiſh you greater Succeſs, and beg that you will always continue me in the Number of thoſe whom you permit to ſubſcribe themſelves, as I do now,

*Sir,*
*London, April* 2, 1798. *Your moſt obedient and*
*moſt faithful Servant,*
Ralph Real.

### *A Letter of Enquiry of Health.*

*Hammerſmith, May* 9, 1798.

*SIR,*

NOT hearing from you in ſuch a Length of Time, as from the 11th of June laſt, I am concerned, leſt Sickneſs, or ſome other Accident, hath happened to you, or to ſome one of your Family; my Uneaſineſs occaſions my giving you this Trouble, and I wiſh that I may find Things with you better than my Fears ſuggeſt: however, be pleaſed to let me know the Certainty with all convenient Speed; and thereby you'll very much oblige,

*Sir,*
*Your real Friend,*
*and very humble Servant,*
Peter Pitiful.

### *A Letter by Way of Petition to a Friend.*

*Honoured Sir,*

I AM uncertain whether my late Misfortunes have come to your Knowledge; however I muſt humbly preſume on your Good-nature, being aſſured of ſundry Examples of your Compaſſion, that, you will think of and take Pity on the Diſtreſſed; therefore, as an Object truly deſerving Compaſſion, I moſt humbly implore and petition you to conſider the many Loſſes and Diſappointments that I have lately met with, which have reduced me to ſuch neceſſitous Circumſtances, that I cannot poſſibly proceed in my Affairs: You was pleaſed once to ſtile me your Friend, and ſo I was indeed: And ſo I would moſt certainly be now, and ſhew it by a ſignal Proof of Kindneſs, if our Circumſtances were changed, by ſtanding between you and Misfortune, ſcreening you from the Contempt incident to Poverty and Diſtreſs. I doubt not, Sir, but your Generoſity and Goodneſs is as great; and I hope, with all Humility, you will be pleaſed to interpoſe your good Offices between Ruin and,

*Sir,*
*Your very humble Servant,*
Laurence Luckleſs.

### *A Letter of Kindneſs.*

*SIR,*

YOUR's of the 25th *ult.* is now before me; in Anſwer to which I poſitively declare, that Mr. *A. B.* hath not been with me, to preſent the Bill of Exchange that you mention in your Letter of Advice to me, and therefore there can be no juſt Cauſe of Proteſt, or any other Charge, put on,

*Sir,*
*London, June* 10, 1798. *Your humble Servant,*
John Innocent.

It is as proper to know how to ſubſcribe, and how to direct, as it is to write a Letter.

### SUPERSCRIPTIONS.

*To the King's moſt Excellent Majeſty.*
*To the Queen's moſt Excellent Majeſty,* &c.
To the Prince, *To his Royal Highneſs,* &c.
To the Princeſs, *To her Royal Highneſs,* &c.

To

### To Archbiſhops.

*To his Grace the Lord Archbiſhop of Canterbury*; or, *To the moſt Reverend Father in God*, &c.

### To Biſhops.

*To the Right Reverend Father in God*, &c.

### To Deacons, Archdeacons, &c.

*To the Reverend* A. B. *D. D. Dean of* W.

### To the Inferior Clergy.

*To the Reverend Mr.* A. &c. or, *To the Reverend Doctor*, &c.

### To the great Officers of State.

*To the Right Honorable* A. *Lord L. Lord High Chancellor of* Great Britain.—*Lord Preſident of the Council*—*Lord Privy Seal.*—*One of his Majeſty's principal Secretaries of State*, &c.

### To Temporal Lords.

*To his Grace the Duke of*, &c. *To the moſt Honorable the Marquis of*, &c. *To the Right Honorable the Earl of*, &c. *To the Right Hon. the Lord Viſcount*, &c. *To the Right Hon. the Lord*, &c.

The eldeſt Sons of Dukes, Marquiſſes, and Earls, enjoy by the Courteſey of *England*, the ſecond Title belonging to their Father; thus the eldeſt Son of a Duke of *Bedford* is called Marquis of *Taviſtock*; of the Duke of *Grafton*, Earl of *Euſton*; of the Earl of *Maccleſfield*, Lord Viſcount *Parker*, &c. and their Daughters are called Ladies, with the Addition of their Chriſtian and Surnames thus: Lady *Carolina Ruſſel*, Lady *Auguſta Fitzroy*, Lady *Betty Parker*, &c.

The younger Sons of Dukes are in like Manner called Lords: and thoſe of Marquiſſes and Earls, together with all the Children of Viſcounts and Barons, are ſtiled *Honorable*.

To a Baronet, *Honorable*; To a Knight, *Right Worſhipful*, and to an Eſquire, *Worſhipful*.—Every Privy Counſellor, though not a Nobleman, hath the Title of *Right Honorable*. All Ambaſſadors have the Style of *Excellency*, as hath alſo the Lord Lieutenant of *Ireland*, and the Captain General of his Majeſty's Forces. The Lord Mayor of *London*, during his Mayoralty, hath the Title of *Right Honorable*. And the Sheriffs, during that Office, have the Title of *Right Worſhipful*. All Mayors of Corporations have the Title of *Eſquires*, during their Office.

### *For the Beginning of Letters.*

To the King; *Sire,* or *May it pleaſe your Majeſty.*
To the Queen; *Madam,* or *May it pleaſe your Majeſty.*
To the Prince; *Sir,* or *May it pleaſe your Royal Highneſs.*
To the Princeſs; *Madam,* or *May it pleaſe your Royal Highneſs.*
To a Duke; *My Lord,* or *May it pleaſe your Grace.*
To a Ducheſs; *Madam,* or *May it pleaſe your Grace.*
To an Archbiſhop; *May it pleaſe your Grace.*
To a Marquis; *My Lord,* or *May it pleaſe your Lordſhip.*
To a Marchioneſs; *Madam,* or *May it pleaſe your Ladyſhip.*
To an Earl, Viſcount, or Baron; *My Lord,* or *May it pleaſe your Lordſhip.*
To their Conſorts; *Madam,* or *May it pleaſe your Ladyſhip.*
To a Biſhop; *My Lord,* or *May it pleaſe your Lordſhip.*
To a Knight; *Sir,* or *May it pleaſe your Worſhip.*
To his Lady; *Madam,* or *May it pleaſe your Ladyſhip.*
To a Mayor, Juſtice of Peace, Eſquire, *&c. Sir,* or *May it pleaſe your Worſhip.*
To the Clergy; *Reverend Sir*; *Mr. Dean*; *Mr. Archdeacon*; *Sir,* &c. as Circumſtances may require.

At ſubſcribing your Name, conclude with the ſame Title you began with; as, *my Lord, your Lordſhip's,* &c.

To either Houſe of Parliament, and to Commiſſioners, Bodies corporate;

*To the Right Honourable the Lords Spiritual and Temporal in Parliament aſſembled.*

*To the Honourable the Knights, Citizens, and Burgeſſes, in Parliament aſſembled.*

*To the Right Honourable the Lords Commiſſioners of the* Treaſury *or* Admiralty.

*To the Honourable, the Commiſſioners of his Majeſty's Cuſtoms; Revenue of the Exciſe, &c.*

*To the Right Worſhipful the Governors of* Chriſt's Hoſpital.

*To the Maſters, Wardens, and Court of Aſſiſtants of the Worſhipful Company of Stationers.*

### *Of Secret Writing.*

HERE it may not be improper to ſay ſomething of Secret Writing; of which Biſhop *Wilkins,* in his Book of *Mathematical Magic,* ſpeaks largely; but it is principally concerning writing in Cypher, which requires great

reat pains and an uncommon Share of Ingenuity, both in Vriters and Readers. But however I ſhall ſhew two or hree particular Ways, that are very pretty and amuſing, nd alſo very eaſy both as to Coſt and Pains. And,

*Firſt*, If you dip your Pen in the Juice of a Lemon, or f an Onion, or in your own Urine, or in Spirits of Vitriol, nd write on clean Paper whatever you intend, it ſhall not e diſcerned till you hold it to the fire, and then it will ppear legible.

Another Way, is when you write a Letter that you inend it ſhall not be diſcovered, but by thoſe you think fit; irſt to write your Thoughts on one ſide of your Letter vith black Ink, as uſual, (but it ought to be on thin Paper) nd then, on the contrary ſide go over the ſaid Matter that ou would have ſecret, with a clean Pen dipped in Milk, nd that Writing ſhall not be read without holding it to he fire, as mentioned above, and then it will appear *egible* in a bluiſh colour.

A third method is, to have two pieces of paper equal in ize, and the uppermoſt cut in chequered holes or ſquares ig enough to contain any word of ſix or ſeven ſyllables, nd in thoſe ſquares write your mind in regular ſenſe; and hen take off the ſaid chequered paper, and fill up the vaancies with words of any kind, which will render it perect nonſenſe, and not capable of being read to any purpoſe f intelligence. And tranſmit and ſend the ſaid uppermoſt, or chequered paper, or another exactly of the ame form to your Correſpondent; whereby he ſhall, by aying it nicely on your ſaid Letter, read your intended enſe, without being perplexed with the words of amuſement, intermixed, which make it altogether unintelligible.

Or again, you may write to your friend in proper ſenſe with common Ink, and let the lines be at ſo commodious a diſtance, that what you intend to be ſecret may be written between them with Water, wherein Galls have been ſteeped a little time, but not long enough to tincture the Water; and, when dry, nothing of the writing between the ſaid lines can be ſeen; but when it is to be read, you muſt with a fine hair pencil dipped in Copperas-water go between the ſaid lines, and ſo you make it legible.

*Note*, This way will give you no ground for ſuſpicion, becauſe the Letter ſeemeth to carry proper ſenſe in thoſe lines that are ſet at a proper diſtance.

Of

## *Of ARITHMETIC.*

AFTER writing, the next neceſſary ſtep towards qualifying a perſon for buſineſs, is the underſtanding that truly laudable and moſt excellent accompliſhment, the noble Science of *Arithmetic*, a knowledge ſo neceſſary in all the parts of life and buſineſs, that ſcarce any thing is done without it.

In my directions for its attainment I ſhall proceed with ſuch plainneſs of method, and familiarity of ſtile, as ſhall render it eaſy to be underſtood and conſpicuous to the meaneſt capacity.

And firſt of *Notation* and *Numeration*.

In *Notation* we muſt note, or obſerve, that all Numbers are expreſſed by, or compoſed of, theſe ten figures, or characters following, *viz.*

| *One,* | *Two,* | *Three,* | *Four,* | *Five,* | *Six,* | *Seven,* | *Eight,* | *Nine,* | *Cypher,* |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |

Nine of theſe are called ſignificant figures, to diſtinguiſh them from the *Cypher*, which of itſelf ſignifies nothing: but as it is placed in whole numbers, ſerves to increaſe the value of the next figure or figures that ſtand before it; as 3 is but three; but before the cypher, thus, 30, the 3 becomes thirty, &c.—But in Decimal Fractions, 0 decreaſes the value of figures behind it, for, there, 3 is three-tenths of any thing; but by placing 0 before it, thus, 03, it is decreaſed from 3 tenth parts to 3 hundredth parts of any thing, &c. We are to note, That every one, or any of the above-mentioned nine figures, or digits, have two values; one certain, and another uncertain; the certain value is when it ſtands alone by itſelf; the uncertain is, when joined or placed with other figures or cyphers: for when any one of theſe figures ſtand alone, they ſignify no more than their own ſimple value; as 5 is but five, 4 but four, 6 but ſix, and 3 no more than three, *&c.* And this is the certain value of a figure: But when another figure or cypher is annexed, they then are increaſed in their value ten times; as 5, or 5 Units or Ones, to 5 tens, or fifty; 4 to 4 tens, or forty; 6 to 6 tens, or ſixty; and 3 to 3 tens, or thirty; as thus, 51, fifty-one; 42, forty-two; 63, ſixty-three; 34, thirty-four, *&c.* Again, if any of the ſaid figures ſtand in the third place towards the left-hand, they ſignify ſo many hundreds as they expreſſed Units or Ones; as 500, is five hundreds, 400, four hundreds, 600, ſix hundreds, and 300, three hundreds, &c. If any of them poſſeſs the 4th place towards the left-hand, they are ſo many thouſands as they contain Units; and ſo any or every figure increaſes by a ten-fold proportion, from the right-hand to the left, according to the place it is found or ſtands in; ſo that 5 may be either five or fifty; five hundred, or five thouſand; in the firſt place, 5: in the ſecond, 50; in the third, 500; in the fourth place, 5000, &c. The true value of figures in conjunction may be fully learnt and underſtood by the following table.

### *The Numeration Table.*

| 12 C Thouſ. of M. | 11 X Thouſ. of M. | 10 Thouſ. of M. | 9 C of Millions. | 8 Tens of Millions. | 7 Millions. | 6 C of Thouſands. | 5 Tens of Thouſands. | 4 Thouſands. | 3 Hundreds. | 2 Tens. | 1 Units. | Thouſ. of Millions. | Millions. | Thouſands. | Units or Ones. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 123 | 456 | 789 | 012 |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 12 | 345 | 678 | 901 |
|  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 234 | 567 | 890 |
|  |  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |  | 123 | 456 | 789 |
|  |  |  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |  | 12 | 345 | 678 |
|  |  |  |  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |  | 1 | 234 | 567 |
|  |  |  |  |  |  | 1 | 2 | 3 | 4 | 5 | 6 |  |  | 123 | 456 |
|  |  |  |  |  |  |  | 1 | 2 | 3 | 4 | 5 |  |  | 12 | 345 |
|  |  |  |  |  |  |  |  | 1 | 2 | 3 | 4 |  |  | 1 | 234 |
|  |  |  |  |  |  |  |  |  | 1 | 2 | 3 |  |  |  | 123 |
|  |  |  |  |  |  |  |  |  |  | 1 | 2 |  |  |  | 12 |
|  |  |  |  |  |  |  |  |  |  |  | 1 |  |  |  | 1 |

For the eaſier Reading of any Number, firſt get the Words at the Head of the Table by Heart; as Units, Tens, Hundreds, Thouſands, &c. and apply them thus; 75, five Units, Five; and 7 Tens, Seventy; that is, Seventy-five. Again, 678; 8 Units, Eight; 7 Tens, Seventy; and 6 Hundreds, ſix Hundred; that is ſix Hundred

Hundred Seventy-eight. Once more, 3456; Units, ſix; 5 Tens, Fifty; 4 Hundreds, four Hundreds; 3 Thouſands, three Thouſands; together, three Thouſand, four Hundred Fifty-ſix. The 4th Line of the Table, *viz.* 123456789, may be read thus: One Hundred twenty-three Millions, four Hundred Fifty-ſix Thouſand, ſeven Hundred Eighty-nine. But the Manner of reading any Number may be rendered more intelligible by Stops, thus; make a Comma after every third Figure or Cypher, beginning at the Right-hand, and ſo on towards the Left, thereby diſtinguiſhing every third Place into Hundreds, as Hundreds of Units, Hundreds of Thouſands, Hundreds of Millions, and Hundred Thouſands of Millions, *&c.* And for Trial, let's read the firſt Line of the Table; where the laſt Place in Valuations is Hundred-Thouſand of Millions, and being pointed into Periods, will ſtand thus, 123,456,789,012, and is to be read thus, One Hundred, twenty-three Thouſand, four Hundred fifty-ſix Millions, ſeven Hundred eighty-nine Thouſands (no Hundreds) and Twelve. Again, the following Number, *viz.* 276,245,678,921,460, is to be read thus; 276 Million of Millions, 245 Thouſands of Millions, 678 Millions, 921 Thouſands, 460 Units or Ones; that is, two Hundred and ſeventy-ſix Millions of Millions, two Hundred forty-five Thouſand ſix Hundred ſeventy-eight Millions, nine Hundred twenty-one Thouſands four Hundred and Sixty. The foregoing *Table of Numeration* is on the Right-hand diſtinguiſhed into ſuch periods, for the eaſier reading thereof; and the like is frequently done in the Public-Office, and by Men of Buſineſs.

Numbers to be read or written, *viz.*

96, *Ninety-ſix.*
242, *Two hundred forty-two.*
7924, *Seven thouſand* 9 *hundred* 24.
54006, *Fifty-four thouſand and ſix.*
524707, *Five hundred* 24 *thouſand* 707.
4706240, *Four millions* 706 *thouſand* 240.
62700472, *Sixty-two millions* 700 *thouſand* 472.
474960204, *Four hundred* 74 *millions* 960 *thouſand* 204.
4214007042, *Four thouſand* 214 *millions* 7 *thouſand* 42.
44214800240, *Forty-four thouſand* 214 *millions* 8 *hundred thouſand* 240.

### *Of Numerical Letters.*

Numbers were anciently expreſſed by letters: and it is neceſſary to underſtand them, for the readier reading the dates to years, frequently uſed in the Title-pages of books, on Funeral Monuments, in Roman Hiſtory, &c.

I *ſignifies One,*
V *Five,*
X *Ten,*
L *Fifty,*
C *An Hundred,*
CC *Two Hundred,*
D or IƆ *Five Hundred,*
M or CIƆ *A Thouſand,*
IƆƆ *Five Thouſand,*
CCIƆƆ *Ten Thouſand,*
IƆƆƆ *Fifty Thouſand,*
CCCCIƆƆƆƆ *A Hundred Thouſand,*
IƆƆƆƆƆ *Five Hundred Thouſand.*
CCCCCIƆƆƆƆƆ *Ten Hundred Thouſand or a Million.*

M.DCCXCVIII *expreſſes the preſent date of* 1798.

M. *being one Thouſand,* D. *five Hundred,* CC *two Hundred and* XCVIII. *Ninety-eight; together one Thouſand, ſeven Hundred and Ninety-eight.*

When a letter of inferior value ſtands after one of ſuperior, its value is to be added thereto; thus VI, VII, and VIII, ſignify ſix, ſeven, and eight; but when a letter of inferior value is placed before one of ſuperior, then its value is to be taken therefrom, thus IV, IX, XL, and XC, ſignify four, nine, forty, and ninety.

## *ADDITION,*

IS the putting together two or more numbers or ſums, ſo as their total value may be diſcovered or known.

Herein we muſt always obſerve to ſet the numbers, to be added, orderly one under the other; that is, Units under Units, Tens under Tens, Hundreds under Hundreds, &c. as in the ſubſequent Examples.

*Addition of Numbers of one Denomination.*

| | *Yards.* | |
|---|---|---|
| | T. | U. |
| | 2 | 4 |
| | 4 | 2 |
| | 6 | 8 |
| | 8 | 6 |
| | 2 | 4 |
| | 4 | 2 |
| 2 | 8 | 6 |

| | | *Gallons.* | |
|---|---|---|---|
| | H. | T. | U. |
| | 7 | 5 | 6 |
| | 4 | 3 | 2 |
| | 5 | 7 | 8 |
| | 6 | 9 | 6 |
| | 4 | 2 | 2 |
| | 6 | 7 | 8 |
| 3 | 5 | 6 | 2 |

| | | | | | *Pounds.* |
|---|---|---|---|---|---|
| X. of | | | | | |
| | Th. | Th. | H. | T. | U. |
| | 5 | 7 | 9 | 6 | 2 |
| | 3 | 9 | 7 | 4 | 4 |
| | 6 | 7 | 2 | 2 | 2 |
| | 7 | 9 | 6 | 7 | 4 |
| | | 2 | 4 | 9 | 2 |
| | | | 3 | 9 | 0 |
| 2 | 4 | 7 | 4 | 8 | 4 |

In Addition of ſimple Numbers, whether it be *Yards*, *Gallons*, *Pounds*, or any thing elſe, remember to carry 1 for every 10 that you find in the Right-hand Row, or Rank of Figures, being Units to the next Row of Tens; and the like from the Rank of Tens to the Row of Hundreds, &c. and whatever it makes in the laſt Row, you muſt ſet down, amount to what it will.

The Numbers above are ſet down in Order, as before directed; that is, Units under Units, Tens under Tens, &c. as may be plainly underſtood, by being indicated at the Head of each Row, or Rank, by U. T. H. &c. ſignifying Units, Tens, Hundreds, &c. Then in caſting up each Example to know its Total, I begin at the Right-hand, or Unit's Rank of the firſt Example, and ſay 2 and 4 is 6, and 6 is 12, and 8 is 20, and 2 is 22, and 4 is 26; in which Row there are two Tens, and 6 over; wherefore I ſet down 6 juſt under its own rank, and carry 2 to the next Row, and ſay 2 that I carry, and 4 makes 6, and 2 is 8, and 8 is 16, and 6 is 22, and 4 is 26, and 2 is 28; and this being the laſt Row, I ſet down the Amount, *viz.* 28; ſo that the total Number of Yards is found to be 286. And the Amount of the next or 2d Example is found by the ſame Method to be 3562 Gallons. And in the third and laſt Example, the total Number of Pounds is found by the ſame Way to be 247484. And ſo the total of any other Example of the ſame Kind, *viz.* ſimple Numbers of one Denomination may be found. *Note*, That when any of the Ranks amount to juſt 10, 20, 30, 40, 50, &c. then you muſt ſet down the 0 under its proper Rank, and carry either 1, 2, 3, 4, or 5, according to the Number of Tens that you find to the next Row.

And ſo much for *Addition of Numbers of one Denomination* which never varies from what has been ſaid above; obſerving ſtrictly to keep to the critical, and nicely ſetting down in perpendicular Order your ſeveral Numbers, that Units may preciſely and directly ſtand under Units, Tens under Tens, *&c.* as hath been fully declared before. The next in Order, of courſe, is *Addition of Numbers of ſeveral Denominations*; or *Addition of Money.*

In *England,* or *Great Britain,* Accounts are kept in Pounds, Shillings, Pence, and Parts of a Penny; ſo you are to note, that.

4 *Farthings* make 1 *Penny,*
12 *Pence* 1 *Shilling,* and
20 *Shillings* 1 *Pound.*

In adding of theſe you are with the ſame Punctuality to mind, that Pounds be ſet directly under Pounds, Shillings under Shillings, Pence under Pence, and Farthings under Farthings; as in the Example hereafter following.

But before you proceed, it will be neceſſary to have the following Tables by Heart, for the readier Remembrance of how many Shillings there are in a Number of Pence, and how many Pounds are contained in a Number of Shillings, *&c.*

*Note,* that *l.* ſtands for Pounds, *s* for Shillings, *d.* for Pence, and *qr.* for farthing, thoſe being the initial Letters of *Libra, Solidus, Denarius,* and *Quadrans, Latin* words of the ſame Signification.

| *Pence* | *s.* | *d.* | *s.* | *l.* | *s.* |
|---|---|---|---|---|---|
| 20 is | 1 | 8 | 20 is | 1 | 0 |
| 30 | 2 | 6 | 30 | 1 | 10 |
| 40 | 3 | 4 | 40 | 2 | 0 |
| 50 | 4 | 2 | 50 | 2 | 10 |
| 60 | 5 | 0 | 60 | 3 | 0 |
| 70 | 5 | 10 | 70 | 3 | 10 |
| 80 | 6 | 8 | 80 | 4 | 0 |
| 90 | 7 | 6 | 90 | 4 | 10 |
| 100 | 8 | 4 | 100 | 5 | 0 |
| 110 | 9 | 2 | 110 | 5 | 10 |
| 120 | 10 | 0 | 120 | 6 | 0 |

The Uſe of theſe Tables is this: whenever you are caſting up any Sum of Money you begin at the right-hand (as before in Sums of one Denomination) ſuppoſe at the Place of Pence, then if the Rank, Row, or Denomination of Pence amounts, from the Bottom to the Top, to 56; your Table of Pence tells you, that 50*d.* is 4*s.* and 2*d.* to which adding 6*d.* the Sum is 4*s.* 8*d.* If to 92*d.* the Table tells you, that 90*d.* is 7*s.* 6*d.* which with 2*d.* over is 7*s.* 8*d.* And if to 81*d.* the Table ſhews that 80*d.* is 6*s.* 8*d.* and 1*d.* more makes 6*s.* 9*d.* &c.

The *Shilling Table* ſerves to lead you to a quick Recollection, how many Pounds there are to ſo many Shillings; as admit the Rank of Shillings ariſes to 57*s.* the Table ſays that 50*s.* is 2*l.* 10*s.* and 7*s.* over makes 2*l.* 17*s.* If to 84*s.* the Table declares, that 80*s.* is juſt 4*l.* and 4*s.* over, make 4*l.* 4*s.* If to 112*s.* the Table tells you that 100*s.* is 5*l.* and 12*s.* more make 5*l.* 12*s.* &c.

### *Addition of Money.*

Money owing, and Money received as follows:

| | ( 1 ) | *L.* | *S.* | *D.* | | ( 2 ) | *L.* | *S.* | *D.* |
|---|---|---|---|---|---|---|---|---|---|
| Owe to | Mr. *Andrews* | 4 | 12 | 6 | Rec. for | *Tobacco* | 46 | 10 | 9 |
| | Mr. *Bent* | 7 | 6 | 9 | | *Sugar* | 79 | 16 | 0 |
| | Mr. *Crawley* | 4 | 12 | 0 | | *Indigo* | 42 | 18 | 3 |
| | Mr. *Dupper* | 6 | 17 | 7 | | *Broad Cloth* | 66 | 12 | 4 |
| | Mr. *Ealin* | 5 | 6 | 6 | | *Canary* | 90 | 16 | 0 |
| | Mr. *Franklin* | 4 | 12 | 3 | | *Port Wine* | 84 | 7 | 6 |
| | Mr. *Gregory* | 6 | 0 | 0 | | *Rice* | 24 | 12 | 0 |
| | Mr. *Fiſher* | 5 | 15 | 4 | | *Logwood* | 60 | 10 | 0 |
| | | 45 | 2 | 11 | | | 496 | 2 | 10 |

I begin with the Right Hand Rank, that is the Pence in the Example of Money owing, and ſay 4 and 3 is 7, and 6 is 13, and 7 is 20, and 9 is 29, and 6 makes 35 Pence; now 30 Pence, according to the Table, is 2*s.* 6*d.* and 5*d.* more makes 2*s.* and 11*d.* I ſet down 11 exactly under the Rank of Pence, and ſay, 2 Shillings that I carry (which I do to the Rank of Shillings) and 5 is 7, and 2 is 9, (for I take firſt only the Units Rank of Shillings) and 6 is 15, and 7 makes 22, and 2 is 24, and 6 is 30, and 2 makes 32: and now being come to the Top of the Sum, and it making 32, I come down with the Tens of Shillings, ſaying

ing 32 and 10 is 42, and 10 is 52, and 10 is 62, and 10 is 72 and 10 makes 82 Shillings; and the Table telling me that 80 Shillings is 4 Pounds, I know therefore 82*s.* is 4*l.* 2*s.* wherefore I ſet down the odd 2*s.* juſt under the Row of Shillings, and carry 4 Pounds to the Pounds; ſaying, 4 that I carry and 5 is 9, and 6 is 15, and 4 is 19, and 5 is 24, and 6 is 30, and 4 is 34, and 7 is 41, and 4 makes 45 Pounds; ſo that the Total of thoſe ſeveral Sums of Money, due to the ſeveral Perſons, amounts to 45*l.* 2*s.* 11*d.*

In the Example of Money received, I begin at the Right-Hand Rank as before, and ſay, 6 and 4 is 10, and 3 is 13, and 9 makes 22, and 22 Pence being 1*s.* 10*d.* I ſet down 10 and carry 1*s.* to the Shillings; ſaying, 1 that I carry and 2 is 3, and 7 is 10, and 6 is 16, and 2 is 18, and 8 is 26, and 6 makes 32; then I come down with the Tens, ſaying, 32 and 10 makes 42, *&c.* and find at the Bottom it comes to 102 Shillings, which makes 5*l.* 2*s.* I ſet down 2*s.* and carry 5*l.* to the Pounds, ſaying, 5 that I carry and 4 is 9, *&c.* I find that at the Top it amounts to 36, whereof I ſet down 6 exactly under its own Rank, *viz.* the Rank of Units of Pounds, and carry 3 for the 3 Tens that are in 30, for at all times in the Addition of the Left-hand Denomination, whether it be Money, Weight, or Meaſure; that is in the Denomination of Pounds, Tons, or Yards, you muſt for every Ten carry one to the next Row, *&c.* ſaying, 3 that I carry, and 6 is 9, and 2 is 11, and 8 is 19, *&c.* and I find that at the Top it comes to 49; wherefore I ſet down 49 to the Left-hand of the 6; and the Total Amount of the Money received for thoſe particular Goods or Wares ſold is 496*l.* 2*s.* 10*l.*

### *More Examples for Practice.*

| | | *l.* | *s.* | *d.* | *l.* | *s.* | *d.* | *l.* | *s.* | *d.* |
|---|---|---|---|---|---|---|---|---|---|---|
| Money due from | Mr. *Money* | 17 | 12 | 6¼ | 146 | 12 | 3½ | 4 | 10 | 6 |
| | Mr. *Gaunt* | 26 | 10 | 2 | 287 | 10 | 9 | 0 | 7 | 9 |
| | Mr. *Herne* | 50 | 0 | 0 | 46 | 16 | 6 | 1 | 0 | 0 |
| | Mr. *James* | 44 | 12 | 8½ | 100 | 0 | 0 | 1 | 1 | 0 |
| | Mr. *King* | 60 | 14 | 0 | 72 | 12 | 1 | 0 | 4 | 6 |
| | Mr. *Long* | 29 | 16 | 6¾ | 69 | 16 | 6¾ | 0 | 10 | 0 |
| | Mr. *Monk* | 16 | 10 | 0 | 460 | 12 | 9 | 4 | 14 | 4 |
| | Mr. *Napper* | 20 | 0 | 0 | 49 | 10 | 0 | 0 | 7 | 6 |
| | Mr. *Oliver* | 27 | 11 | 4½ | 7 | 12 | 4½ | 0 | 1 | 6 |
| | Mr. *Perkins* | 17 | 4 | 8 | 13 | 10 | 0 | 0 | 2 | 6 |
| | Mr. *Quinton* | 20 | 10 | 3 | 164 | 12 | 9 | 3 | 10 | 9 |
| | Mr. *Roper* | 46 | 16 | 0 | 75 | 10 | 6 | 1 | 10 | 0 |
| | Total | 377 | 18 | 3 | 1494 | 16 | 6¾ | 18 | 0 | 4 |

### *Addition of Avoirdupois Weight.*

By this Weight are weighed all Kinds of *Grocery* Goods or Wares, or Goods ſubject to Waſte; as *Tobacco, Sugars, Fruit* and *Drugs*; as alſo *Fleſh, Butter, Cheeſe, Allum, Tallow, Iron, Braſs, Copper, Lead, Tin, Pewter, Pitch, Tar, Roſin, Hemp, Flax, Soap, Salt,* &c.

A Table of this Weight is as follows, *viz.*

4 Quarters make 1 Dram, marked *dr.*
16 Drams 1 Ounce - *oz.*
16 Ounces 1 Pound - *lb.*
28 Pounds 1 q. of a Hundred Weight - - *qrs.*
4 Quarters 1 Hundred Weight *C.*
20 Hundred Weight 1 Ton *T.*

| 10 4 28 | 10 4 28 | 10 4 28 | 10 16 16 |
|---|---|---|---|
| *C. qrs. lb.* | *G. qrs. lb.* | *C. qrs. lb.* | *lb. oz. dr.* |
| 5—1—16 | 24—2—12 | 9—1—16 | 24—11—12 |
| 4—2—24 | 42—2— 0 | 4—3—26 | 42—14—15 |
| 6—3— 6 | 16—0—12 | 7—1— 0 | 64—10—11 |
| 7—1—12 | 25—3—24 | 5—3—27 | 29— 9—10 |
| 9—0—20 | 19—0—20 | 4—3— 2 | 16—12—13 |
| 6—2— 0 | 26—1—22 | 2—2— 2 | 27—13—14 |
| 39—3—22 | 154—3— 6 | 34 3 17 | 206— 9—11 |

In theſe Examples, the Manner of proceeding is the ſame as in the former, obſerving, that the Number of Units of each leſſer Denomination, which make an Unit of the next greater, found by the preceding Table, is placed above each Rank of Numbers; that is to ſay, in the firſt Example, 28 the Number of Pounds contained in a Quarter of a Hundred Weight, is placed over the Column of Pounds; now that Column, when added up, makes 78, which contains two 28s, and 22 over, wherefore I ſet down 22 under the Column of Pounds, and carry 2 to the Column of Quarters, and ſo on.

*Note*, That in weighing at the water-ſide, or elſewhere, they do not weigh by the Ton, though ſome Goods are ſold by it, as *Iron*, *Logwood*, *Cheeſe*, &c. but by the Hundred, Quarters, and Pounds, which are afterwards reduced to and computed by Tons.

## *Addition of Troy Weight.*

By this Weight are weighed *Jewels*, *Gold*, *Silver*, *Pearls* and *Medicines*, and the uſual Denominations are *Pounds*, *Ounces*, *Penny-weights*, and *Grains*, as in the following Table, *viz.*

24 *Grains make* 1 *Penny-weight.*
20 *Penny-weights* 1 *Ounce*, and
12 *Ounces* 1 *Pound Troy Weight.*

## *Examples of Troy Weight.*

| 6 Ingots of Silv. wt. *viz.* | | | | | 10 | 12 | 20 | 24 | 12 | 20 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | *lb.* | *oz.* | *pw.* | *gr.* | *lb.* | *oz.* | *pw.* | *gr.* | *oz.* | *pwt.* | *gr.* |
| 1 Wt. | 4 | 5 | 12 | 10 | 14 | 6 | 10 | 11 | 204 | 10 | 14 |
| 2 | 5 | 4 | 16 | 17 | 24 | 10 | 11 | 12 | 96 | 7 | 17 |
| 3 | 3 | 11 | 19 | 20 | 21 | 6 | 4 | 17 | 100 | 11 | 12 |
| 4 | 4 | 6 | 7 | 12 | 22 | 10 | 12 | 14 | 56 | 16 | 20 |
| 5 | 5 | 1 | 11 | 12 | 16 | 11 | 12 | 13 | 212 | 10 | 23 |
| 6 | 4 | 11 | 12 | 13 | 22 | 7 | 6 | 17 | 96 | 19 | 12 |
| | 28 | 6 | 0 | 12— | 123 | 4 | 18 | 12— | 767 | 17 | 2 |

If what was before ſaid be duly obſerved, the Performance of the above Examples will be attended with no Difficulty.

### *How to prove Addition.*

IN all *Additions*, whether of ſimple Numbers, that is, Numbers of one Denomination; or in Examples compound, that is of divers Denominations, as *Pounds*, *Shillings*, *Pence* and *Farthings*, &c. the readieſt Method of Proof is to caſt the ſame downwards (beginning at the Top as you did the ſame upwards, beginning at the Bottom) and if that Operation produces the ſame Total, the Work is infallibly right, and beyond any Contradiction; and this is much better, and more feaſible than the common Method uſed in Schools, of making two Totals, by omitting the upper Line in the Second. I might here alſo give ſeveral Examples of other *Additions*, ſuch as *Apothecaries Weight*, *Cloth*, *Liquid*, *Dry* and *Long Meaſures*, *Time*, &c. but the Method ſerves for any of them, having reſpect to the Tables belonging to thoſe ſeveral Denominations, which are as follow, *viz.*

### *A Table of the Parts of Apothecaries Weight.*

| | | |
|---|---|---|
| 20 *Grains* | 1 *Scruple* | ℈ a Scruple. |
| 3 *Scruples* | 1 *Dram* | ʒ a Dram. |
| 8 *Drams* | 1 *Ounce* | ℥ an Ounce. |
| 12 *Ounces* | 1 *Pound* | ℔ a Pound. |

By theſe Weights they compound their Medicines; but they buy and ſell their drugs by *Avoirdupois Weight*.

### *Cloth Meaſure.*

| | |
|---|---|
| 4 *Nails*, or 9 *Inches*, | 1 *qr. of a Yard.* |
| 4 *qrs.* or 36 *Inches*, | 1 *Yard.* |
| 5 *qrs.* or 45 *Inches*, | 1 *Ell Engliſh.* |
| 3 *qrs.* or 27 *Inches*, | 1 *Ell Flemiſh.* |
| 6 *qrs.* or 54 *Inches*, | 1 *Ell French.* |

### *A Table of Wool Weight.*

*Note*, 7*lb.* make 1 *Clove*; 2 *Cloves*, or 14*lb.* 1 *Stone*; 2 *Stones*, or 28*lb.* 1 *Todd*; 6 *Todd* and ½ 1 *Wey* or 182*lb.* 2 *Weys*, or 364*lb.* 1 *Sack*; and 12 *Sacks* 1 *Laſt*, or 4368*lb.* 240*lb.* 1 *Pack of Wool.*

*Note*, That 1*lb.* 2*oz.* 12*pw.* *Troy*, is equal to a Pound *Avoirdupois*; and a Pound *Troy* is about 13*oz.* 2 *Drams* and a half *Avoirdupois*.

| | | *l.* | *s.* | *d.* |
|---|---|---|---|---|
| A Pound Weight *Troy* | of Silver is worth | 3 | 2 | 2 |
| A Pound Wt. *Avoirdupois* | | 4 | 15 | 3 |

$$100l. \left\{\begin{array}{l}\text{in Gold}\\ \text{in Silver}\end{array}\right\} \text{weighs} \left\{\begin{array}{ll}1 & 11\frac{3}{4}\\ 26 & 04\end{array}\right\} \textit{Avoi. Wt.}$$

A pound *Avoirdupois* is heavier than a Pound *Troy*; but an Ounce *Troy* is heavier than an Ounce *Avoirdupois*.

### *A Table of Liquid Meaſure.*

*Liquid Meaſure* is of two Sorts *viz.* one for *Wine*, *Brandy*, &c. and the other for *Beer* and *Ale*.

### *Wine*, &c.

8 Pints 1 Gallon,
42 Gallons 1 Tierce,
63 Gallons 1 Hogſhead,
84 Gallons 1 Puncheon,
2 Hogſheads 1 Pipe or Butt,
2 Pipes or Butts 1 Tun, or 252 Gallons.

*Note*, That *ſweet Oil* hath 236 Gallons to the Tun; but Oil from *Greenland* hath 252 Gallons to the Tun.

*Note*, The Wine Gallon contains 231 Cubic or Solid Inches, by which all Liquids are meaſured, except Beer and Ale.

### *Beer Meaſure.*

8 Pints 1 Gallon,
9 Gallons 1 Firkin,
18 Gallons 1 Kilderkin,
2 Kilderkins 1 Barrel, or 36 Gallons,
1 Barrel and half, or 54 Gallons, 1 Hogſhead.

### *Ale Meaſure.*

8 Pints 1 Gallon,
8 Gallons 1 Firkin of Ale, Soap, or Herrings.
2 Firkins, 1 Kilderkin,
2 Kilderkins 1 Barrel, or 32 Gallons,
1 Barrel and half, or 48 Gallons 1 Hogſhead.

*Note*, The *Beer* and *Ale* Gallon are the ſame, viz. 282 ſolid Inches; but with this Difference, *i. e.* the Barrel of Beer contains 1128 Cubic Inches, or 4 Gallons more than the Barrel of Ale.

| *In a Tun of Wine are* | *In a Pipe or Butt are* |
|---|---|
| 2 Pipes or Butts, | 2 Hogſheads, |
| 6 Tierces, | 3 Tierces, |
| 252 Gallons, | 126 Gallons, |
| 504 Pottles, | 252 Pottles, |
| 1008 Quarts, | 504 Quarts, |
| 2016 Pints, | 1008 Pints. |

*In a Puncheon are*
84 Gallons
168 Pottles
336 Quarts
672 Pints

*In a Hogſhead are*
63 Gallons
126 Pottles
252 Quarts
504 Pints.

*In a Barrel of Beer are*
2 Kilderkins.
4 Firkins
36 Gallons
72 Pottles
144 Quarts
288 Pints.

*In a Barrel of Ale are*
2 Kilderkins
4 Firkins
32 Gallons
64 Pottles
128 Quarts
256 Pints.

## *Dry Meaſure.*

2 Pints 1 Quart
2 Quarts 1 Pottle
2 Pottles 1 Gallon
2 Gallons 1 Peck
4 Pecks 1 Buſhel Land Meaſure
5 Pecks 1 Buſhel Water Meaſure
4 Buſhels 1 Comb, or half-Quarter
2 Combs 1 Quarter
4 Quarters 1 Chaldron
5 Quarters 1 Wey
2 Weys 1 Laſt or 10 Quarts
4 Fatts, or Vats, or 36 Buſhels of Sea Coal, 1 Chaldron; and 21 Chaldron is accounted a Score in the River *Thames.*

Salt and Sea-Coal are heaped, or elſe there are 5 Pecks to the Buſhel.

*In the Laſt are*
2 Weys
10 Quarters
80 Buſhels
320 Pecks
1280 Pottles
2560 Quarts
5120 Pints.

*In a Wey are*
5 Quarters
40 Buſhels
160 Pecks
320 Gallons
640 Pottles
1280 Quarts
2560 Pints.

*Note,* By an Act, *Anno* 1712, the Buſhel is 2178 Cubic Inches, and a Gallon of this Meaſure is 272¼ Cubic Inches.

## *Long Meaſure.*

8 Barley Corns 1 Inch
12 Inches 1 Foot
3 Feet 1 Yard
3 Feet 9 Inches, 1 Ell Eng.
5 Feet a Geometrical Pace
5 Yards and a half, 1 Pole, Perch, or Rod
6 Feet, 2 Fathom, or 2 Yds.
40 Poles, or 220 Yds. 1 Furlong
8 Furlongs 1 Mile, or 1760 Yards
3 Miles 1 League.

*In a Mile are*

| | |
|---|---|
| 8 Furlongs | 5280 Feet |
| 320 Poles | 63360 Inches |
| 1760 Yards | 506880 Barley Corns. |

*Land Meaſure.*

5 Yards and a half, 1 Pole, Perch, or Rod.
40 Poles make 1 Furlong, or quarter of an Acre.
160 Poles in Length, and 1 in Breadth, is 1 Acre.
80 Poles in Length, and 2 in Breadth, 1 Acre; and
40 Poles in Length, and 4 in Breadth, 1 Acre.
4 Poles in Length make 1 Chain.
10 Chains in Length, and 1 in Breadth, make 1 Acre.

*Time.*

| | *In a Year are* |
|---|---|
| 60 Seconds 1 Minute | |
| 60 Minutes 1 Hour | |
| 24 Hours 1 natural Day | 31557600 Seconds |
| 7 Days 1 Week | 525960 Minutes |
| 4 Weeks 1 Month | 8766 Hours |
| 13 Months, 1 Day, and 6 Hours, 1 ſolar year. | 365 Days 6 Hours. |

*Note*, The Solar Year is divided into 12 Calendar Months, which contains 365 Days, according to this good old Verſe, *viz.*

*Thirty Days hath* September, April, June, *and* November,
February *hath* 28 *alone, and all the reſt have Thirty-one.*

## SUBTRACTION.

THE next Rule in Arithmetic is *Subtraction* (commonly but erroneouſly called *Subſtraction)* and this Rule teaches to take a leſſer Number out of a greater, and ſheweth the Remainder, Exceſs or Difference.

Place the leſſer Number under the greater (with the ſame Care, and in the ſame Order as in Addition) draw a line under them, and beginning at the Right-hand, take each Figure in the lower Line from the Figure under which it ſtands; but if the Figure in the lower Line is greater than that in the upper, then in Numbers of one Denomination, ten muſt be borrowed and added to the Figure in the upper Line; then take the Figure

gure in the lower Line from the Sum, and write down the Remainder, but for every ten thus borrowed, one muſt be paid or added to the next Left-hand Figure in the lower Line. *Example:* ſuppoſe Mr. *Andrews* owes to Mr. *Baker* 323*l.* whereof Mr. *A.* hath paid to Mr. *B.* the ſum of 146*l.* in part; what remains due to Mr. *Baker?* *Anſwer*

177*l.*

Here the leſſer Number 146 ſtands under the greater 323; and to find the Remainder, or Sum remaining due, I ſay 6 from 3 I cannot, but 6 from 13 (for you borrow 10 and add it to the Figure or Cypher that ſtands directly over the Figure you ſubtract) and there remains 7; then 1 that I borrowed and 4 is 5, for as I borrowed 10 in the inferior Place, which is equal to one in the ſuperior, ſo I muſt now pay the ſame; therefore I ſay, 5 from 2 I cannot, but 5 from 12 (borrowing 10, and adding it to the Figure 2, as above directed) and there remains 7; then 1 that I borrowed and 1 is 2, from 3, the Figure above it, and there remains 1, and ſo the Example is done; and by it is ſhewn that *A.* ſtill owes *B.* 177 Pounds; for a proof of its verity, add 177 the Remainder, to 146, the leſſer of the two given Numbers, and it will make 323, being the ſame with the greater Number or Sum of Money firſt due; and therefore is a ſure Proof of the Truth and Certainty of the Rule. And as *Subtraction* is proved by *Addition*, ſo may *Addition* be proved by *Subtraction*; for if the two aforeſaid Numbers, *viz.* 323 and 146, are added, their Total is 469; from which if you deduct 146, the Remainder will be the greater Number; or if you ſubtract 323 from the ſaid 469, the Remainder will be 146 the leſſer Number.

All Examples in *Subtraction* of Numbers of one Denomination are performed as above, they varying not at all: but, however, once more, for the better Explanation, admit a great Sheep-maſter hath in all 6904 Sheep and takes out of them 2490 to diſpoſe of at Market, how many doth he leave behind? To know this ſet them down thus:

From—6904 the greater Number,
Take—2490 the leſſer Number.

*Anſwer* 4414

Here I ſay 0 from 4, and there remains 4; then 9 from nothing (or 0) I cannot; but 9 from 10 (adding to the 0) and there remains 1; and 1 that I borrowed and 4 makes 5, and 5 from 9, and there remains 4; and laſtly, 2 from 6, and there remains alſo 4 (for I borrowed none, and therefore there's no occaſion of paying) ſo that he leaves behind him juſt 4414; which put to the Number he takes to Market, makes the Number he had, *viz.* 6904, and ſhews the Deduction to be true, and the Anſwer right.

*More Examples for Practice.*

| | *l.* | *Yards.* | *Gallons.* | *Pounds.* |
|---|---|---|---|---|
| From | 4796 | 3700 | 47200 | 479672 |
| Take | 2929 | 1976 | 31976 | 97694 |
| Rem. | 1867 | 1724 | 15224 | 381978 |
| Proof | 4796 | 3700 | 47200 | 479672 |

The diſtance of time ſince any remarkable event may be found by ſubtracting the date thereof from the date of the preſent year.

*Examples.*

I.—1798
1666 the fire of *London.*

Since 132 Years.

II.—1798
1588 the *Spaniſh* Invaſion.

Since 210 Years.

III.—1798
1605 Gunpowder Treaſon.

Since 193 Years.

*Subtraction of divers Denominations.*

Here if the figure or figures, placed in the lower Line, exceed thoſe in the upper, then as many Units muſt be borrowed, as make a Unit, or one, of the next ſuperior Denomination; and one muſt be carried to the next left-hand Place in the lower Line, as before.

## *Of Money.*

| | 10 | 20 | 12 |
|---|---|---|---|
| | *l.* | *s.* | *d.* |
| *Due* | 9 | 2 | 6 |
| *Paid* | 6 | 16 | 4 |
| *Reſts due* | 2 | 6 | 2 |

Suppoſe Mr. *Campion* owes Mr. *Darnell* 9*l.* 2*s.* 6*d.* and Mr. *C.* hath paid Mr. *D.* in part, 6*l.* 16*s.* 4*d.* what remains due to Mr. *Darnell?* Anſwer, there is due to Mr. *Dar-* 2*l.* 6*s.* 2*d.*

| | *l.* | *s.* | *d.* |
|---|---|---|---|
| *Sold for* | 242 | 16 | $3\frac{3}{4}$ |
| *Paid in Part* | 174 | 12 | $6\frac{1}{2}$ |
| *Anſwer* | 68 | 3 | $9\frac{1}{4}$ |

Again Mr. *Edwards* ſells to Mr. *Francis*, *Spaniſh* Wool to the Value of 242*l.* 16*s.* 3*d*$\frac{3}{4}$, and pays preſent money the Sum of 174*l.* 12*s.* 6*d*$\frac{1}{2}$. What Money remains unpaid from Mr. *Francis?* Anſwer, 68*l.* 3*s.* 9*d*$\frac{1}{4}$.

In the firſt of theſe Examples I ſay, 4*d.* from 6*d.* and there remains 2*d.* then 16*s.* from 2*s.* I cannot, but borrowing one Integer of the next Denomination, or 1 Pound which is 20*s.* I ſay 16 from 20, and there reſts 4, and adding thereto the Number 2 it makes 6; wherefore I put down 6 in the Place of Shillings, and ſay, 1 that I borrowed and 6 is 7; now 7*l.* from 9*l.* there remains 2*l.* ſo the Money reſting due to Mr. *Darnell* is 2*l.* 6*s.* 2*d.* as in the Example.

In the ſecond Example, I ſay 2 Farthings (or an Halfpenny) from 3 Farthings, and there remains 1 or $\frac{1}{4}$, which I ſet down in its proper Place, *viz.* under the Denomination of farthings; then 6 from 3 I cannot, but 6 from 12, (as marked over the Denomination) and there remains 6, and 3*d.* over it makes 9*d.* which I place under the Line in its right place, *viz.* of Pence; then 1 that I borrowed (that is 1 Shilling) and 12 is 13; 13*s.* from 16*s.* and there reſts 3, which I likewiſe ſet down under its own Rank; then 4 from 2 I cannot, but 4 from 12 (borrowing 10) and there reſts 8; then 1 that I borrow and 7 makes 8; 8 from 4 I cannot, but 8 from 14, and there remains 6; ſo that the Sum remaining due is 68*l.* 3*s.* 9*d*$\frac{1}{4}$, as in the Work. For its proof, you muſt add the Remainder, 68l. 3*s.* 9*d*$\frac{1}{4}$ to the leſſer, or under Sum, 174*l.* 12*s.* 6*d*$\frac{1}{2}$, and it makes 242*l.* 16*s.* 3*d*$\frac{3}{4}$, the Sum firſt due, and is a Proof of the Work's being right.

*More Examples for Practice.*

| | 10 | 20 | 12 4 | 10 | 20 | 12 | 10 | 20 | 12 4 |
|---|---|---|---|---|---|---|---|---|---|
| | *l.* | *s.* | *d.* | *l.* | *s.* | *d.* | *l.* | *s.* | *d.* |
| *Due*——— | 174 | 16 | 6 ¼ | 74 | 10 | 4 | 2471 | 07 | 0 |
| *Paid*——— | 97 | 12 | 4 ¾ | 29 | 12 | 9 | 1976 | 16 | 6½ |
| *Remain*——— | 77 | 04 | 1 ½ | 44 | 17 | 7 | 494 | 10 | 5½ |
| *Proof*——— | 174 | 16 | 6 ¼ | 74 | 10 | 4 | 2471 | 07 | 0 |

| | 10 | 20 | 12 | 10 | 20 | 12 | 10 | 20 | 12 |
|---|---|---|---|---|---|---|---|---|---|
| *1ſt Due*——— | 74 | 00 | 00 | 274 | 16 | -6 | 796 | 00 | -0 |
| *Paid*——— | 46 | 12 | 10 | 197 | 19 | -4 | 279 | 11 | -7 |
| *Balance*——— | 27 | 07 | 02 | 76 | 17 | 2 | 516 | 08 | -5 |
| *Proof*——— | 74 | 00 | 00 | 274 | 16 | 6 | 796 | 00 | -0 |

Sometimes a Sum owing may be paid at ſeveral Times; then the ſeveral Payments muſt be added together, and their Total deducted from the Sum firſt due, as in this and the Examples following.

*Owing* 266*l.*

*Paid at Times*—
20
15
30
90
17
24
60

*Paid in all* 256 *deduct,*
*Reſts due* 10

*Proof* 266

| | l. | s. | d. |
|---|---|---|---|
| *More due* | 249 | 12 | 0 |
| *Received at ſeveral Times* | 24 | 12 | 6 |
| | 9 | 14 | 6 |
| | 20 | 00 | 0 |
| | 16 | 16 | 6 |
| | 22 | 10 | 5 |
| | 13 | 12 | 6 |
| | 7 | 16 | 4 |
| *Received in all* | 115 | 02 | 9 |
| *Reſts due* | 134 | 09 | 3 |
| *Proof* | 249 | 12 | 0 |

| | l. | s. | d. |
|---|---|---|---|
| *Received* | 100 | 10 | 0 |
| *Paid to ſeveral Perſons.* | 6 | 16 | 0 |
| | 10 | 00 | 0 |
| | 5 | 12 | 6 |
| | 20 | 10 | 0 |
| | 7 | 09 | 6 |
| | 9 | 08 | 6 |
| | 7 | 12 | 6 |
| *Paid in all* | 67 | 09 | 0 |
| *Remains in the Bag.* | 33 | 01 | 0 |
| | 100 | 10 | 0 |

## *Avoirdupoiſe Weight.*

| | 10 | 20 | 4 | 28 | 10 | 4 | 28 | 10 | 16 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Tons* | *C.* | *qrs.* | *lb.* | *C.* | *qrs.* | *lb.* | *lb.* | *oz.* | *dr.* |
| *From* | 44 | 12 | 1 | 10 | 246 | 2 | 12 | 146 | 02 | 10 |
| *Take* | 39 | 14 | 2 | 06 | 164 | 3 | 22 | 97 | 10 | 12 |
| *Rem.* | 4 | 17 | 3 | 04 | 81 | 2 | 18 | 48 | 07 | 14 |
| *Proof* | 44 | 12 | 1 | 10 | 246 | 2 | 12 | 146 | 02 | 10 |

## *Troy Weight.*

| | 10 | 12 | 20 | 24 | 10 | 20 | 24 |
|---|---|---|---|---|---|---|---|
| | *lb.* | *oz.* | *pwt.* | *gr.* | *oz.* | *pwt.* | *gr.* |
| *From* | 462 | 4 | 10 | 11 | 1247 | 10 | 13 |
| *Take* | 196 | 9 | 6 | 16 | 976 | 16 | 17 |
| *Remain* | 265 | 7 | 3 | 19 | 270 | 13 | 20 |
| *Proof* | 462 | 4 | 10 | 11 | 1247 | 10 | 13 |

And ſo much for *Subtraction*; which Method will ſerve for any Denomination whatever, having Reſpect to the ſeveral Tables of Quantity, as before hinted, in *Addition.*

## MULTIPLICATION.

THE next Rule in Order is *Multiplication*, and perhaps the moſt ſerviceable Rule in Buſineſs, for its quick Diſpatch of all others in *Arithmetic*, which I ſhall endeavour to ſhew by its Nature, Quality, and Uſe. Now,

1. *Multiplication* is a Rule, that by two Numbers given, teacheth us to find out a third, which ſhall contain either of the two, as many times as the other containeth an Unit:
2. *Multiplication* is alſo a compendious Work of *Addition:*
3. It ſerves likewiſe to bring great Denominations into ſmall, as Pounds into Shillings, Pence, or Farthings.
4. Having the Length and Breadth of a plain Surface, we find its Content in ſuperficial or Square Meaſure.
5. By *Multiplication* we find, having the Value of one Thing, or the Wages of one perſon, how to know the Value of many ſuch Things, or the Wages of many ſuch Perſons.

In *Multiplication* we are particularly to take Notice of theſe three Terms, *viz.*

$$\text{The}\begin{cases}\textit{Multiplicand,}\\ \textit{Multiplier,}\text{ and}\\ \textit{Product.}\end{cases}$$

1. The *Multiplicand* (generally the greater of the two Numbers) is the Number to be multiplied.
2. The *Multiplier* (generally the leſſer of the two Numbers) is the Number by which the former is to be multiplied.
3. The *Product* is the reſult of the work, or Anſwer. The *Multiplier* and *Multiplicand* are collectively called *Factors*.

But before any Procedure can be made in this Rule, it is neceſſary to have the following Table by heart, and that very perfectly.

### *The Multiplication Table.*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 |
| 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 77 | 84 |
| 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 99 | 108 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99 | 110 | 121 | 132 |
| 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |

This Table is ſo plain and eaſy, that there is no need of Direction; for the Product of any two Figures will be found in that Square, which is on a Line with the one and under the other; thus 54 the Product of 6 times 9, will be found on a Line with 6, and under 9, or in a Line with 9, and under 6; ſo 7 times 8 is 56, and 8 times 7 is 56, &c. And thus the Table ought to be got by heart for the more dexterous Readineſs in multiplying.

Now for Application.

*Example* 1. How many is 3 times 472? Which being ſet down in the Margin; I ſay, 3 times 2 is 6, which place under 3 the Multiplier; then 3 times 7 is 21; ſet down 1 under 7, and carry 2 for the 2 Tens, as in *Addition of one Denomination*, then 3 times 4 is 12, and 2 carried is 14; which ſet

472
3
1416

down, and the Product is 1416: that is 3 Times 472 make ſo much; which may be proved by *Addition*, by ſetting down 472 three Times in Additional Order, and caſting it up, which makes the Aſſertion good in the ſecond Definition, that this Rule compendiouſly performs the Office of Addition. Likewiſe the foregoing Example agrees with the firſt Definition; for as three Times 472 make 1416, ſo doth 472 Times 3 make the ſame, *viz.* 1416.

*Example* 2. Again, how many are produced by multiplying 742 by 4?

742 *Multiplicand.*
  4 *Multiplier.*
——
2968
——

Here I ſay, 4 times 2 is 8, and 4 times 4 is 16; 6 and carry 1; and 4 times 7 is 28, and 1 is 29, which ſet down; ſo the whole product is 2968, as appears by the work.

More Examples of one Figure in the *Multiplier* are theſe, *viz.*

| | | | | | |
|---|---|---|---|---|---|
| *Multiplic.* | 7420 | 4444 | 7460 | 90704 | 56789 |
| *Multiplier.* | 5 | 6 | 7 | 8 | 9 |
| *Product.* | 37100 | 26664 | 52220 | 725632 | 511101 |

### *Compound Multiplication,*

Is when the *Multiplier* conſiſts of two, three, or more Figures or Cyphers.

And here you muſt begin with that Figure which is in the Place of Units of the *Multiplier*, and go through the whole *Multiplicand*, by multiplying each Figure of it firſt by the ſaid Unit Figure, then by the next, to wit, by the Figure in the Place of Tens of the *Multiplier*; then with the third, &c. to the laſt; always remembering to place the firſt Figure of every Product or Line (for you will ever have as many as you have ſignificant Figures in the *Multiplier*) I ſay, remember to place the firſt Figure of each Line exactly and perpendicularly under the Figure you multiply by; and then add the ſeveral Lines or Products together, which, ſo collected, give the total Product required, as in the Examples following, *viz.*

*Example* 1.

How many are 23 Times 7426? Firſt I begin with the Unit Figure 3 in the *Multiplier*, ſaying 3 Times 6 is 18; 8 (which I ſet directly under 3, by which I multiply) and carry one; then 3 Times 2 is 6, and 1 is 7; then 3 Times 4 is 12; 2 and carry 1; then 3 Times 7 is 21, and 1 is 22; and ſo I have done with the firſt Figure of the *Multiplier*, *viz.* 3. Then I go to the next, that is 2, and twice 6 is 12; 2 and I carry 1 (which 2 is placed in a direct Line under 2 the multiplying Figure) then twice 2 is 4, and 1 is 5; then twice 4 is 8; and laſtly, twice 7 is 14, which I ſet down; then I add the two Products together, ſaying 8 is 8, &c. and the Total is the true Product or Reſult of the Multiplication, *viz.* 170798. Again

```
   7426
     23
 ------
  22278
 14852
 ------
 170798
```

*Example* 2.

What is the Product of ——————— 527527
Multiplied by 285

```
   527527
      285
 ---------
  2637635
 4220216
1055054
 ---------
150345195
 ---------
```

It will appear too prolix, and altogether unneceſſary, to give more verbal Directions; nay, indeed, nauſeous Tautology, ſince thoſe given above are ſufficient; and therefore the Learner is referred to the Obſervation of the Example, as alſo to thoſe two that follow, *viz.*

```
      527535          275827
       15728           19725
  ----------      ----------
     4220280         1379135
    1055070         551654
   3692745         1930789
  2637675         2482443
  527535          275827
  ----------      ----------
  8297070480      5440687575
  ----------      ----------
```

When Cyphers are intermixed with Figures in the *Multiplier*, then multiply the Figures as above; and when you come to a Cypher in the *Multiplier*, then ſet down another Cypher exactly and perpendicularly under it, then begin the *Multiplicand* again with the next Figure to the Cypher in the

*Multiplier*, and go through it in the ſame line, placing the firſt figure of that product next the Cypher, towards the left-hand, but then heed muſt be taken that the next figure or cypher of the next line muſt be ſet down one degree farther towards the left-hand, and not immediately under the laſt figure ſet down to the cypher: as in the following examples may be fully underſtood.

| | | |
|---|---|---|
| 24393 | 784371 | 327586 |
| 402 | 23604 | 6030 |
| 48786 | 3137484 | 9827580 |
| 975720 | 47062260 | 19655160 |
| 9805986 | 2353113 | 1975343580 |
| | 1568742 | |
| | 18514293084 | |

When you have a Cypher or Cyphers in the *Multiplier*, it the beginning towards the right-hand, then ſet it, or hem, backwards from the place of Units towards the ight-hand; and when you have multiplied by the figure r figures, annex the cypher or cyphers.

*As in theſe Examples.*

| | | |
|---|---|---|
| 4762 | 47962 | 4632 |
| 70 | 400 | 2600 |
| 333340 | 19184800 | 27792 |
| | | 9264 |
| | | 12043200 |

If you have cyphers both in the *Multiplicand* and *Multilier*, then neglect the cyphers in both, and multiply by he figures, and annex the cyphers at laſt;

*As in theſe Examples.*

| | | |
|---|---|---|
| 42600 | 42300 | 376400 |
| 220 | 12000 | 2400 |
| 852 | 846 | 15056 |
| 852 | 423 | 7528 |
| 9372000 | 507600000 | 903360000 |

When you are to multiply by 10, 100, 1000, or 10,000, it is only adding or annexing ſo many Cyphers to the *Multiplicand*, that is, either 1, 2, 3, or 4 Cyphers, and the Work is done. *Example.* Suppoſe I am to multiply 375 by the Numbers above; if I multiply it by 10, then I join 0 to 375, and then it makes, or the product is, 3750; if by 100, then I annex 00, and then it makes 37500; if by 1000, I put to it 000, and then it produces 375000; and laſtly, if by 10,000 I then add 0000, and then it makes 3750000, &c. And thus may any number be multiplied when the *Multiplier* conſiſts of a Unit with any Number of Cyphers, and done by inſpection only, without any formal ſetting down the *Multiplicand* with a Line drawn under it, &c.

Thus for Direction in the manner how to multiply; the next will be to ſhew the Uſes of *Multiplication* in real Buſineſs, and how to apply it on proper Occaſions, *viz.*

1. Suppoſe you want to know how many Half Crowns there are in 246*l.* you know that 8 Half-Crowns make 1*l.* wherefore ſet them down thus:

| | |
|---|---|
| | 246*l.* |
| Multiply by | 8 |
| Anſwer | 1968 |

Again, in 1968 Half-Crowns, how many Pence?

| |
|---|
| 30 |
| 59040 |

And this ſerves to make out, that great Denominations are brought into ſmaller by this Rule, according to the third Definition.

2. Admit you wanted to know the Contents of a large Shuffle-board Table, 34 Feet long, and 4 Feet wide, multiply 34 the Length by 4 the Breadth, and the Anſwer will be 136 ſquare Feet for the true Contents of ſuch a Table. And this agrees with the fourth Definition of this Rule.

3. If I know the Value of a Yard of Broad-cloth to be 12 Shillings, what is the Value of 220 Yards of the ſaid Cloth in Shillings?

Mul-

220
Multiply by 12

440
220

2640 Shillings, or 132 Pounds.

If the Wages of 1 Seaman be 23 Shillings a Month, hat is the Wages of 250 Seamen for the ſame Time?

Multiply by 23

750
500

Anſwer 5750 Shillings, or 287*l.* 10*s.*

And theſe two Examples accord with the fifth Defini-ion, or Uſe of this Rule.

And thus much for common *Multiplication.*

I ſhall, in the next Place, ſay ſome ſmall Matter con-erning *Multiplication of Money*, and a little of its Uſe, and o conclude this Rule.

### *Multiplication of Money.*

Multiplication of Money (what moſt would learn above ny thing) hath great Affinity to *Addition of Money*; the ame Method being taken in carrying from one Denomina-ion to the next, *viz.* from Farthings to Pence, from Pence o Shillings, and from Shillings to Pounds. And as in *Ad-ition* (and other *Multiplications*) you begin at the Right-and, and proceed towards the Left, ſo here you begin at he leaſt denomination, which is alſo at the Right-hand. This Method of accompting is the moſt apt and expedi-ious of all others, for ſmall Quantities, and therefore ex-remely neceſſary in making Bills of Parcels, *&c.* and is, eyond all Contradiction, as ſure and certain as any Way hatſoever.

### *The General Rule,*

Is always to multiply the Price by the Quantity.

The firſt Step is, for Quantities from 2 to 12; and this s done by one Multiplier, as in the Examples following.

When you are to multiply by 10, 100, 1000, or 10,000, it is only adding or annexing ſo many Cyphers to the *Multiplicand*, that is, either 1, 2, 3, or 4 Cyphers, and the Work is done. *Example.* Suppoſe I am to multiply 375 by the Numbers above; if I multiply it by 10, then I join 0 to 375, and then it makes, or the product is, 3750; if by 100, then I annex 00, and then it makes 37500; if by 1000, I put to it 000, and then it produces 375000; and laſtly, if by 10,000 I then add 0000, and then it makes 3750000, &c. And thus may any number be multiplied when the *Multiplier* conſiſts of a Unit with any Number of Cyphers, and done by inſpection only, without any formal ſetting down the *Multiplicand* with a Line drawn under it, &c.

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Anſwer 1968

Again, in 1968 Half-Crowns, how many Pence,
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59040

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Multiply by 12

440
220

2640 Shillings, or 132 Pounds.

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Multiply by 23

750
500

Anſwer 5750 Shillings, or 287*l.* 10*s.*

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### *The General Rule,*

Is always to multiply the Price by the Quantity.

The firſt Step is, for Quantities from 2 to 12; and this s done by one Multiplier, as in the Examples following.

*Example* 1.

l. s. d.
Multiply——————————— 7 12 6
(or 6 Pieces of Cloth at 7*l.* 12*s.* 6*d.* *per* Piece) by 6

45 15 0

Here I ſay 6 Times 6 is 36 Pence, which is juſt 3*s.* I ſet down 0 in the Place of Pence, and carry 3*s.* to the Place of Shillings, (exactly the ſame as in *Addition of Money*) then 6 Times 12 is 72, and 3 is 75*s.* or 3*l.* 15*s.* wherefore I ſet down 15 in the Place of Shillings, and carry three to the Pounds; then 6 Times 7 is 42, and 3 is 45*l.* So the whole Amount of the 6 Cloths, at 7*l.* 12*s.* 6*d.* *per* Cloth, is 45*l.* 15*s.* as in the Work, which is very conciſe.

*Example* 2.

Again, How much is 9 Times 13*s.* 4*d.* or what is the Amount of 9 Marks? 9

In this Example I ſay, 9 Times 4 is 36*d.* or 3*s.* I ſet down 0, and carry 3; then 9 Times 3 is 27, and 3 makes 30; I ſet down 0, and carry 3 (as in Multiplication of ſimple Numbers); then 9 Times 1 is 9, and three is 12; which is in the Place of Tens of Shillings, and being halved, make juſt 6*l.* and ſo much is the Value of 9 Marks.

6 0 0

*Example* 3.

Once more: What comes 12 Gallons of Wine to, at 5*s.* 4*d.* *per* Gallon?

s. d.
5 4
12

Here I ſay 12 Times 4 is 48; 0 and carry 4; then 12 Times 5 is 60, and 4 is 64*s.* or 3*l.* 4*s.* &c.

*l.* 3 4 0

The next Degree or Step of Advance in this way of Reckoning is of Quantities exceeding 12, even to 12 Times 12, or 144; all which, as far as 144, are found in that excellent Table, the *Table of Multiplication*; which is a ready Help to all Purpoſes of Reckoning, and particularly in this Way; and that you may proceed with Dexterity you muſt be very ready in the ſaid Table, that you may be immediately apprehenſive what component Parts hit your Quantity propoſed, or pretty near it (for any quantity below 12 needs no Recollection at all, as in two of the Examples foregoing) and then work accordingly: If the Quantity be 15 Yards, I readily know that 3 Times 5 is 15; and therefore 3 and 5, or 5 and 3, are to be my Multipliers: If the Quantity were 21, then 3 and 7, or 7 and 3, would be Multipliers; if 30, then 5 and 6, or 6 and 5; alſo 3 and 10, or 10 and 3; if 45, 48, 56, 66, 72, 96, &c. were the Quantities, then 5 and 9, 6 and 8, 7 and 8, 6 and 11, 6 and 12, and 8 and 12, &c. are to be my Multipliers, and exactly hit the ſeveral Quantities of which they are component Parts; and Examples of this Kind have two Multiplications for their Solution.

When the Quantity propoſed is a Number irregular, or ſuch a Number that no two Numbers in the Table can be found to anſwer it, then we muſt multiply by two ſuch Nnmbers as come pretty near it, as is ſaid above; and for the Number wanting to make up the Number or Quantity propoſed, multiply the given Price of one by the Number that is wanting, which will make three Products by three Multiplications; which laſt Product muſt be added to the foregoing Products reſulting from two Multiplications, and the Total will be the Anſwer.

And firſt, I ſhall ſhew Examples of the ſecond Step, *viz.* f Regular Quantities that exceed 12, and are preciſely nſwered at two Multiplications, ſuch as mentioned above, *viz.*

|  | s. | d. |
|---|---|---|
|  | 3 | 5 |
|  |  | 3 |
|  | 10 | 3 |
|  |  | 5 |
| 2 | 11 | 3 |

What comes 15 Yards of Muſlin to, at 3s. 5d. *per* Yard?

Here 3 Times 5 is 15*d.* or 1*s.* and 3*d.* and carry 1*s.* then 3 Times 3 is 9, nd 1 is 10*s.* ſo the firſt Product is 10*s.* and 3*d.* which multiply by 5, ſaying, 5 Times 3 is 15*d.* or 1*s.* and 3*d.* and carry 1; then 5 Times 10 is 50, nd 1 is 51*s.* or 2*l.* 11*s.* So the Amount of 15 Yards, t 3*s.* 5*d.* *per* Yard, is 2*l.* 11*s.* 3*d.* And demonſtrable hus, *viz.* If 10*s.* 3*d.* be the Value of 3 Times 3*s.* nd 5*d.* then 5 Times the Value of 10*s.* 3*d.* muſt of neceſſity be 15 Times the Value of 3*s.* 5*d.* becauſe 5 Times is 15: And its Truth may be proved by *Addition,* and *Multiplication,* thus; ſet down 3*s.* 5*d.* three Times, in dditional Order, and put the three Lines together, and e Total of them multiply by 5, as before, and the Anſwer will be the ſame. Or ſet down 17*s.* 1*d.* (the Product of 3*s.* 5*d.* multiplied by 5) three Times alſo, and add them together, and the Total will be exactly the ſame with the Reſult of Multiplication; as in the following Specimens of Work.

| (1) | (2) | (3) |
|---|---|---|
| *s.* *d.* | *s.* *d.* | *s.* *d.* |
| 3—5 | 3—5 | 17—1 |
| 3—5 | 5 | 17—1 |
| 3—5 | | 17—1 |
| 10—3 | 17—1 | 2—11—3 |
| 5 | | |
| 2—11—3 | | |

Here the firſt of theſe two Proofs is worked by *Addition* and *Multiplication*, and the ſecond by *Multiplication* (as per Margin) and *Addition*. Alſo,

By this we ſee, that in all Examples under this Head, we are to pitch on two Numbers (for *Multipliers*) in the Table; which multiplied together, make the Quantity propoſed; and then we are to multiply the Price by one of the Numbers (it matters not by which firſt) and then that Product is to be multiplied by the other Number, and the ſecond or laſt Product will be the Anſwer.

*Example* 2.

Again, what is the Value of 21 Gallons of Brandy?

*s.* *d.*
at 7—9 *per Gallon.*
7 and 3
2—14—3
3
8— 2—9

In this Example I ſay, 9 Times 7 is 63*d.* or 5*s.* 3*d.* I ſet down 3 and carry 5; then 7 Times 7 is 49, and 5 is 54*s.* or 2*l.* 14*s.* So the firſt Product is 2*l.* 14*s.* 3*d.* which I multiply by 3, and that produces the laſt Product or Anſwer, *viz.* 8*l.* 2*s.* 9*d.*

Now follow a few more Examples of this Sort, without any verbal Directions, becauſe I think thoſe already given to be ſufficient.

*Example* 3.

What comes 30 Ells of
Holland to, s. d.
at 3 7 *per Ell.*
10 and 3

1 15 10
3

*Anſ.* 5 7 6

*Example* 4.

45 Pounds of Raw Silk,
at 15*s.* 6*d. per lb.*
5 and 9

3 17 6
9

*Anſ.* 34 17 6

*Example* 5.

56 Buſhels of Wheat,
*s. d.*
at 4 9
7 and 8

1 13 3
8

*Anſ.* 13 6 0

96 C. of Currants,

*Example* 6.

*s. d.*
72 Broad Pieces, 23 6 *each*
12 and 6

14 2 0
6

84 12 0

*Example* 7.

108 *lb.* of Indigo Lahore
at 7*s.* 8*d.*
9 and 12

3 9 0
12

*Anſ.* 41 8 0

*Example* 8.

*l. s. d.*
2 13 6 *per C.*
8 and 12

21 8 0
12

*Anſwer* 256 16 0

E The

The next Gradation of Advance is of Quantities irregular, or of Numbers that are not to be anſwered preciſely at two *Multiplications*: In this Caſe there ariſeth no Increaſe of Difficulty, but it is as eaſy as the Examples foregoing: Only here you will have an Addition of one Line more, occaſioned by bringing down the Price of one to be added to the laſt Product; or elſe a Line more made by multiplying the Price by what is defective or wanting in the Number by two Multiplications, to make up the propoſed Quantity complete; as it may be of 2, 3, 4, 5, *&c.* as by the ſubſequent Examples may be ſeen and underſtood.

*Example* 1. What is the Product of 2*l.* 13*s.* 6*d.* multiplied by 39?

| | | | |
|---|---|---|---|
| *l.* 2 | 13 | 6 | |
| | | 6 | and 6 |
| 16 | 1 | 0 | |
| | | 6 | |
| 96 | 6 | 0 | |
| 8 | 0 | 6 | |
| 104 | 6 | 6 | |

Here I find that 6 multiplied by 6, makes 36; which is within 3 of the Quantity propoſed; wherefore I multiply by 6, and that Product again by the other 6; the laſt Product is 96*l.* 6*s.* which is the Value of 36; but we want to know the Value of 39, wherefore I multiply the Price of one, *viz.* 2*l.* 13*s.* 6*d.* by 3 that is defective or wanting to make up 36 to 39, ſaying 3 Times 6 is 18*d.* *&c.* And finding that 3 Times 2*l.* 13*s.* 6*d.* is 8*l.* 0*s.* 6*d.* which added to 96*l.* 6*s.* 0*d.* the Total gives the complete Value of 39; for 36 and 3 make 39. See the Work.

*Example* 2. What comes 79 Cwt. of Cheeſe to at 28*s.* *per* Cwt.

| | | | |
|---|---|---|---|
| *l.* | *s.* | *d.* | |
| 1 | 8 | 0 | |
| | | 7 | and 11 |
| 9 | 16 | 0 | |
| | | 11 | |
| 107 | 16 | 0 | |
| 2 | 16 | 0 | |
| 100 | 12 | 0 | *Anſ.* |

In this Example I ſay, 7 Times 0 is 0; then 7 Times 8 is 56; which is 2*l.* 16*s.* ſet down 16 and carry 2, then 7 Times 1 is 7, and 2 carried make 9. So the firſt Product is 9*l.* 16*s.* 0*d.* which multiplied by 11, produces, 107*l.* 16*s.* 0*d.* or the Value of 77; then for 2 wanting I multiply the Price by it, and that gives 2*l.* 16*s.* 0*d.* which added to 107*l.* 16*s.* 0*d.* makes the whole Value of 79, *viz.* 110*l.* 12*s.* 0*d.* as in the Work. Or, as there are no Pence in the Price, you may multiply 28*s.* by 79, without bringing it into Pounds as you work it, but omit it till the laſt, and then cut off or ſeparate the laſt Figure or Cypher of the Product towards the Right Hand, and halve thoſe towards the Left, when Half will be Pounds, and the Figure cut off Shillings, as in this Example.

```
      s.
      28
      79
     ----
     252
    196
    -----
    2212
    =====
 l. 110. 12
```

The half of 2 is 1, and the half of 1 is 0, which I joined to the two ſevered from 221, makes 12; ſo the Anſwer is 110*l.* 12*s.* as before.

*Example* 3. 112 Pounds of Sugar at 5½*d per lb.* ſet down thus:

```
   s.  d.
       5½ per Pound.
       10 and 10
 ---------
   4   7
       10
 ---------
 2 5   10
   5   6 the Product of 5½ by 12 defective.
 ---------
 2 11  4 the Anſwer.
 ---------
```

Here, after I have multiplied by 10 and 10, the Parts of oo, there wants 12; wherefore I multiplied 5½*d.* by 12, nd it gives 5*s.* 6*d.* for 12*lb.* at 5½*d.* which added to *l.* 5*s.* 10*d.* the Value of 100, makes 2*l.* 11*s.* 4*d.* the true Value of 112*lb.* at 5½*d. per* Pound.

*Example* 4. 94 Stone of Beef at 22*d.* or 1*s.* 10*d. per* Stone.

| | | |
|---|---|---|
| | 1*s.* | 10*d.* |
| | | 10 and 9 |
| | 18 | 4 |
| | | 9 |
| 8 | 5 | 0 |
| | 7 | 4 |
| 8 | 12 | 4 Anſwer. |

Here what is wanting after the two Multiplications, is 4; wherefore I multiply 1*s.* 10*d.* (the Price) by 4, which produces 7*s.* 4*d.* to be added, *&c.*

*Example* 5. 97 cwt. ½ *Raiſins,*

| | *l.* | *s.* | *d.* |
|---|---|---|---|
| at | 1 | 5 | 6 *per Cwt.* |
| | | | 9 and 10 |
| | 11 | 9 | 6 |
| | | | 10 |
| | 114 | 15 | 0 |
| | 8 | 18 | 6 |
| | | 12 | 9 for the ½ C. |
| | 124 | 6 | 3 |

After I have multiplied by 9 and 10, I multiply the Price 25*s.* 6*d.* by the Quantity wanting, and it produces 8*l.* 18*s.* 6*d.* then for the half C. I take half of the Price, which is 12*s.* 9*d.* and then collect the three Lines, the Total of which is 124*l.* 6*s.* 3*d.* for the Anſwer.

Note, From the laſt Example may be obſerved, that there is no need of too much Solicitude, concerning coming ſo very near by two Multiplications, for there 7 is wanting to make up the true Quantity; nay, if the two Multiplications be ſhort by 10 or 12, it is near enough; for it is as eaſy to multiply the Price by 10 or 12, as by 2 or 3, and the Addition is the ſame.

*Example* 6. Once more; what comes 110 C. ¾ of Hops to, at 4*l.* 10*s.* 6*d. per* C.

| *l.* | *s.* | *d.* |
|---|---|---|
| 4 | 10 | 6 |
| | | 10 and 10 |
| 45 | 5 | 0 |
| | | 10 |
| 452 | 10 | 0 |
| 45 | 5 | 0 |
| 2 | 5 | 3 |
| 1 | 2 | 7½ |
| 501 | 2 | 10½ Anſ. |

After having multiplied by 10 and 10, which makes 100, I multiply the Price 4*l.* 10*s.* 6d. by 10 that is wanting, which gives the ſame with the firſt Product, *viz.* 45*l.* 5*s.* 0*d.* which ſtands under the product by 100; and for the ¾ of a C. I take ¾ of the Price, *viz.* firſt the half, and then the half of that half, that is 2*l.* 5*s.* 3*d.* and 1*l.* 2*s.* 7½*d*; which four Lines added together make 501*l.* 2*s.* 10½ for the Anſwer.

### *To prove Multiplication,*

Whether of ſimple Numbers, or of Money, it is moſt ſurely done by *Diviſion*; but before that is known, take this Method, *viz.* As you multiplied the *Multiplicand* by the *Multiplier*, ſo contrariwiſe multiply the *Multiplier* by the *Multiplicand*; and if the Products are alike, the Work is right; or otherwiſe one of them is wrong, and muſt be gone over again till they do agree.

*Example* 1.

365 Days in a Year.
24 Hours in a Day.

1460
730

8760

Here (reverſely) I ſay, 5 times 4 is 20; 0 and carry 2; 6 Times 4 is 24, and 2 is 26; 6 and carry 2; and 3 Times 4 is 12, and 2 is 14. Then 5 Times 2 is 10; 0 and carry 1; 6 Times 2 is 12, and 1 is 13; 3 and carry 1; and 3 Times 2 is 6, and 1 is 7, which Products added together, make 8760, the Hours in a Year, without taking in the odd 6 Hours which the Year doth conſiſt of more than 365 Days.

*Example* 2.

56 Gallons of Spirits
at *s.* *d.*
3 2 *per* Gallon.
7 and 8

1 2 2
8

8 17 4 *Anſwer.*

I ſay here, twice 7 is 14; 2 and carry 1*s.* and 3 Times 7 is 21, and 1 is 22*s.* or 1*l.* 2. Again, twice 8 is 16, 4 and carry 1*s.* and twice 8 is 16, and 1 is 17, 17 and carry 0; and once 8 is 8*l.* Thus both theſe Examples are the ſame in conſequence as if you proceeded in the common and regular Method of *Multiplication*, and ſhews the Truth of the Operation. The next Rule in order, is

## *DIVISION.*

THIS Rule, though accounted the hardeſt Leſſon in *Arithmetic*, yet I ſhall make it eaſy and intelligible to the meaneſt Capacity.

The Uſe of this Rule is to know how many times one Number or Sum is contained in another; as if it were aſked, how often is 9 contained in 54? the Anſwer is 6 Times; or how many Times 12 is there in 144? Anſwer 12 Times.

As by *Multiplication* great Names or Denominations are brought into ſmall; ſo contrarily by *Diviſion*, ſmall Names are brought into greater; as Farthings (from one Gradation to another) into Pounds, Pounds Weight into Tons Weight, and Gallons Liquid, into Tons Liquid, &c.

In this Rule we are to take particular Notice of theſe three certain Terms following, *viz.*

1 The *Dividend*, or Number to be divided.
2 The *Diviſor*, or Number by which we divide.
3 The *Quotient* or Anſwer to the Work; which ſhews how often the Diviſor is contained in the Dividend.

4. The *Remainder*; which is an uncertain Branch of this Rule, becauſe there is ſometimes a Remainder, and ſometimes not. ☞ And you muſt particularly note, that the *Remainder* is ever of the ſame Name with the *Dividend*, and is always leſs than the *Diviſor*, for if it be more, or equal to the *Diviſor*, the Work is wrong.

*Diviſion* is either Single or Compound; *Single* when the *Diviſor* conſiſteth of a ſingle Figure, and the *Dividend* of two at moſt: Any of this Sort is anſwered by the *Multiplication Table*; as if 63 were to be divided by 7, the Anſwer will be 9 Times. Here 63 is the *Dividend*, 7 the *Diviſor*, and 9 the *Quotient* or *Anſwer*.

*Compound Diviſion*, is when the *Dividend* hath many, or more Figures or Cyphers than two, and the *Diviſor* one or more Figure or Cyphers, &c.

### *Example.*

How many times 7 is there contained in 365? Or, how many Weeks in a Year?

*A General Rule for Working.*

Note:
1. Seek . . . . .
2. Multiply . . .
3. Subtract
4. Bring down . . .

```
7) 365 (52
   35
   ---
    15
    14
    --
    (1)
```

Having ſet down the Example with two crooked Lines, or half Parentheſis, one for the Diviſor, and the other for the Quotient, I begin according to the afore-mentioned general Rule for Working, by ſeeking or aſking how often I can take 7, the *Diviſor*, out of 36 the two firſt Figures of the *Dividend* (for I cannot take 7 out of 3 the *Quotient*, being never to begin with 0) and the *Anſwer* is 5 times; wherefore I place 5 in the *Quotient*, and multiply the *Diviſor* 7 by it (as directed in the *General Rule*) ſaying 5 times 7 is 35, which I place under 36, and then thirdly, according to the ſaid Rule, I ſubtract 35 from 36, and there remains 1; to which I bring down the next or laſt Figure of the *Dividend*, *viz.* 5, and then there is 15 for a new *Dividend*, or *Dividual* to work upon; then I aſk or ſeek again, how oft 7 may be taken in 15? and the Anſwer is 2 times; wherefore I put 2 in the *Quotient* next to the 5; by which 2 I alſo multiply the *Diviſor* 7, ſaying twice 7 is 14; which I ſet down under 15, and ſubtract, and there remains 1, which I place between two Semicircles thus (1) as it ſtands in the Work; where obſerve, that 365 is the *Dividend*, 7 the *Diviſor*, 52 the *Quotient*, or *Anſwer*, and 1 the *Remainder*. The *Quotient* declares that 7 is contained in 365, 52 times and 1 over, or remaining; which I ſet over the *Diviſor* thus $\frac{1}{7}$, and ſignifies that there is one ſeventh of a Week, or one Day, more than juſt 52

Weeks in a Year, or 365 Days; which is eaſily to be found by collecting the Day of each Calendar Month, as they ſtand in the Almanack.

*You may note,* That the ſaid $\frac{1}{7}$, one ſeventh, is properly what is called a *Fraction*, or a Piece or Segment of the *Dividend*; of this hereafter.

*Note alſo,* That if there had been more Figures or Cyphers in the *Dividend*, they muſt all have been brought down one by one at a Time (and never but one at a Time) and (after *Subtraction*) ſet to the *Remainder*; and if there remains 0, you muſt ſtill bring down but one Figure or Cypher at a Time; and for every Figure or 0 ſo brought down, there muſt be a Figure or 0 placed in the *Quotient*, according to the Times you can take the *Diviſor* out of the ſeveral *Dividuals* you make, by bringing down a Figure or Cypher at a Time out of the *Dividend*, till all be brought down, and the Work ended.

For a Specimen, let us divide 8060 Pounds of Tobacco equally among 8 Men.

8)8060(1007 *Quotient*
8...
——
60
56
——
(4)

Here I ſay the Eights in 8 once; which I put in the Quotient, then the Eights in 0, 0 Times; which I likewiſe put in the Quotient; then the Eights in 6, 0 Times again; which is alſo placed in the Quotient, and there remains 6; to which I bring down 0, the laſt of the Dividend, and it makes 60: Laſtly, the Eights in 60, 7 Times, and 7 Times 8 is 56 from 60, and there remains 4; ſo the Quotient ſhews that each Perſon muſt have 1007 Pounds of Tobacco for his Share in the Dividend 8060, and there remains 4 Pounds over and above, which makes half a Pound more due to each Man, becauſe 4 the Remainder is half 8 the Diviſor; and ſo the Work is done, the Quotient given to each Man 1007 Pounds and a half for his equal Share.

*Note,* That in the Operation, every time that you bring down a Figure or Cypher, you are to make a Point under it in the Dividend, to ſignify that ſuch Figure or Cypher hath been brought down and done with, as may be obſerved in the foregoing Example.

Though this Way of working is plain, and eaſy to be underſtood, yet it is ſomewhat tedious; and therefore I ſhall ſhew a quicker Way for Diſpatch when the Diviſor is a ſingle Figure; as ſhall be made conſpicuous in the Examples following, *viz.*

| | I. | II. | III. |
|---|---|---|---|
| | 4) 78906 | 5) 34567 | 6) 29702 |
| Quotient | 19726 (2) | 6913 (2) | 4950 (2) |
| | 4 | 5 | 6 |
| Proof | 78906 | 34567 | 29702 |

In the firſt of theſe Examples I ſay, the 4's in 7 once, and there remains 3, which conſidered as placed before 8, the next Figure in the Dividend, makes 38; then the 4's in 38, 9 times; 9 times 4 is 36, from 38, and there remains 2; which makes 9, the next figure in the Dividend, 29; then the 4's in 29, 7 times; 7 times 4 is 28, from 29, and there reſts 1; which makes 0, the next of the Dividend, 10, and the 4's in 10 twice; twice 4 is 8, from 10, and there remains 2; which makes 6; the laſt Figure of the Dividend, 26; laſtly, the 4's in 26, 6 times, and 6 times 4 is 24, from 26, and there reſts 2 the Remainder: and ſo for the other two Examples. And for Proof of the Work (or of any other Examples) multiply the Qeotient by the Diviſor, and take in the Remainder in the firſt Place, or Place of Units; and if the Product be the ſame with the Dividend, the Diviſion is right; for I ſay, 4 times 6 is 24, and 2 the Remainder make 26; 6 and carry 2, &c.

### *More Examples by a ſingle Figure.*

| | | | |
|---|---|---|---|
| | 3) 54321 | 7) 279060 | 9) 234567 |
| Quotient | 18107 (0) | 39865 (5) | 26063 (0) |
| Proof | 54321 | 279060 | 234567 |

This is the ſhorteſt Way of Diviſion that can be by a ſingle figure.

As it is neceſſary for Expedition to divide by 11 and 12, as by a ſingle Figure, to have the Product in one Line, divide as in theſe Example, *viz.*

| | | |
|---|---|---|
| | 11)72646206 | 12)76677240 |
| Quotient | 6604200 (6) | 6389770 |
| | 11 | 12 |
| Proof | 72646206 | 76677240 |
| | 11)47627000 | 12)42007400 |
| Quotient | 4329727 (3) | 3500616 (8) |
| | 11 | 12 |
| Proof | 47627000 | 42007400 |

In the firſt of theſe Examples I ſay the 11's in 72 anſwer 6 Times, &c. In the ſecond I ſay, the 12's in 76, anſwer 6 Times, &c. In the third, the 11's in 47, 4 Times; 4 Times 11 is 44, from 47, and there reſts 3, &c. In the fourth I ſay, the 12's in 42 Times; 3 Times 12 is 36, from 42 there remains 6, &c.

By being ready and dexterous in the Examples above, you may expeditiouſly divide by theſe Numbers, *viz.* 110, 120, 1100, 1200, &c. for it is but cutting off, or ſeparating the Cyphers from 11 and 12, (when theſe Numbers happen to be Diviſors) and cutting off and ſeparating the like Numbers of Figures or Cyphers from the Right-hand of the Dividend, and then divide the other Figures or Cyphers towards the Left-hand, by 11 or 12, as it ſhall happen; as in the Examples following, *viz.*

Divide 34567 by 110, and 890123 by 120, and 98765 by 1100, and 678901 by 1200.

| | | |
|---|---|---|
| | 11 \| 0)3456 \| 7 | 12 \| 0)89012 \| 3 |
| Quotient | 314 $\frac{2}{11}$ or $\frac{27}{110}$ | 7417 $\frac{8}{12}$ or $\frac{83}{120}$ |
| | 11 \| 00)987 \| 65 | 12 \| 00)6789 \| 01 |
| Quotient | 89 $\frac{8}{11}$ or $\frac{865}{1100}$ | 565 $\frac{9}{12}$ or $\frac{901}{1200}$ |

When we divide by 10, 100, 1000, or 10000, &c. you have nothing more to do than to cut off, or to ſeparate ſo many Figures or Cyphers of the Dividend towards the

Right-hand, as you have Cyphers in the Diviſor, and thoſe Figures towards the Left make your Quotient; and thoſe cut off towards the Right-hand the Remainder.

*Examples*

Divide 123456789 by 10, 100, 1000, 10000.
By 10 the Quotient is 12345678, and the Remainder 9.
By 100 the Quotient is 1234567, and Remainder 89.
By 1000 the Quotient is 123456, and Remainder 789.
By 10000 the Quotient is 12345, and Remainder 6789.

When the Diviſor conſiſteth of ſeveral Figures, then there ariſeth a little more Difficulty in the Work; but if the following Directions are heedfully attended to, the ſeeming Difficulty is eaſily overcome; in the ſucceeding Example, *viz.*

Suppoſe I am to divide 78901 Pounds among 32 Pariſhes; or ſuppoſe an Aſſeſſment of ſo much Money was laid on ſo many Pariſhes; what muſt each Pariſh pay by an equal Proportion towards the raiſing ſuch a Supply?

Diviſor 32)78901(. . . . Quotient.

The Example thus ſet out, I begin at the Left-hand, ſeeking how often I can take 32 out of 78; or more eaſy, how many Times 3 there is in 7, and the Anſwer is 2 Times; which I place in the Quotient thus 32)78901(2, and then according to the *General Rule of Workings*, I multiply the Diviſor 32, by the 2 placed in the Quotient, ſaying, twice 2 is 4, and twice 3 is 6; so there is 64 to be taken out of 78, which ſhould ſtand thus:

```
32)78901(2
   64.
   ——
   14
```

Then I make a Point under 9, the third Figure of the Dividend, and bring it down to the Remainder 14, and then the Work appears thus:

```
32)78901(24
   64.
   ——
   149
```

Then I ſeek again, aſking how many Times 32 in 149; which is not readily to be anſwered; but how many Times 3, the firſt Figure of the Diviſor, is there in 14, the two firſt Figures of the Dividual 149, and the Anſwer is 4 Times; wherefore, after placing 4 in the Quotient, I multiply, (as rected in the *General Rule)* the Diviſor 32 by the ſaid 4, ſaying, 4 Times 2 is 8, placing it under 9 in the Dividual; then 4 Times 3 is 12, which ſet down under 14; ſo there is 128 to be taken out of 149, and then the Work appears thus:

```
32)78901(24
   64..
   ----
   149
   128
   ----
    210
```

And after Subtraction there remains 21; then I make a Point under 0 in the Dividend, and bring it down to the Right of the Remainder 21, and then there is 210 for a new Dividual; then as the general Rule directs, I ſeek again, ſaying, how many Times 32, the Diviſor, is there in 210, the Dividual? Or eaſier, how many Times 3 in 21? ☞ But obſerve well, That whenever you have a Place more in the Dividual than in the Diviſor, then always ſeek how oft you can take the firſt Figure of the Diviſor, out of the two firſt of the Dividual, and the Anſwer is 7 Times; but it will not bear 7 Times, for 7 Times 32 is 224, and you cannot take 224 out of 210; or rather you cannot take 22 out of 21; wherefore try in your Mind before you ſet down the Anſwer, or Figure of the Quotient, whether it will go to the Number of Times as is moſt eaſily ſuggeſted; as here the Queſtion or Demand is readily anſwered 7 Times; and ſo many Times 3 may be taken in 21; but when you come to multiply the whole Diviſor by the Times you place in the Quotient, you begin at the Right-hand, and go towards the Left, carrying the Tens that ariſe to the next Place, which ſo increaſes the Product, that ſometimes Subtraction cannot be made, becauſe the under Line is greater than the upper; wherefore firſt try in your Mind as aboveſaid; and ſince it will not bear 7 Times, try if it will go 6 Times; ſaying, 6 Times 2 is 12, 2 and carry 1; and 6 Times 3 is 18, and 1 is 19; and 19 may be taken out of 21; therefore ſet down 6 in the Quotient, next to the 4, and multiply the Diviſor 32 by it, and the Work will ſtand thus:

```
32)78901(246
   64...
   -----
   149
   128
   ------
    210
    192
    ----
     181
```

Here the Diviſor 32 multiplied by 6, gives 192 to be taken out of 210, and the Remainder is 18; to which after a Point made under it, I bring down the 1, the laſt Figure of the Dividend, and then there is 181 for a new Dividual; then according to the Rule, I ſeek again (for you are to note, that the aforeſaid *general rule for working* muſt be as often repeated as you bring down a Figure or Cypher from the Dividend, to make a new Dividual; and alſo, that for every Figure or Cypher brought down, there muſt likewiſe be a Figure or Cypher placed in the Quotient,) how many Times 32, the Diviſor may be taken out of 181, the Dividual; or how many Times 3 in 18, and the ready Anſwer is 6 Times; but on the Trial I find it will not go 6 Times; wherefore I try a Quotient Figure leſs by 1, *viz.* 5 Times, and find it will bear it: and ſetting 5 in the Quotient next to the 6, I multiply the Diviſor 32 by it, and it produces 160; which ſubtracted from 181, the laſt Remainder is 21, and the Quotient or Anſwer is 2465; which ſhews that 32 is contained in 78901, 2465 Times and 21 over.

```
32)78901(2465
   64...
   ---
   149
   128
   ----
    210
    192
    ---
     181
     160
     ---
     (21)
```

Again, admit a Nobleman hath 30,000*l.* *per Ann.* what is his daily income?

If you divide 30,000 by 365 (the Days in the Year) the Quotient will be the Anſwer. Set it down for working thus:

365)30,000(

Firſt, ſeek how many Times 365 can be taken in 300? (an equal Number of Places with the Diviſor) anſwer 0 Times; wherefore I go to a Place farther to the Right-hand, in the Dividend (for 0 muſt never begin the Quotient, as was ſaid before) and make a Point under it, *viz.* under the laſt 0 but one, as may be ſeen in the Example; and there being a Place more in this Dividual than in the Diviſor, I ſeek how oft the firſt Figure of the Diviſor, *viz.* 3 is contained in the two firſt Figures or Places of the Dividend, *viz.* 30, and the Anſwer is 10 Times; but you are never to take above 9 Times at once, in any of theſe Examples of Diviſion; wherefore try in your mind whether it will bear 9 Times, before you ſet it down in the Quotient (as was ſaid before) ſaying to yourſelf, or in your Mind, 9 Times 5 is 45, 5 and go 4; 9 Times 6 is 54, and 4 is 58; 8 and go 5; and 9 Times 3 is 27, and 5 is 32; now 32 cannot be taken out of 30, wherefore take a Figure leſs by an Unit or one, *viz.* 8 Times; and finding it will go 8 Times, ſet down 8 in the Quotient; and then ſay 8 Times 5 is 40; 0 and carry 4; and 8 Times 6 is 48, and 4 is 52; 2 and carry 5, and 8 Times 3 is 24, and 5 is 29; and then there is 2920 to be taken from 3000; and after Subtraction the Work will appear thus:

```
365)30000(8
    2920.
    ----
      80
```

Then to the Remainder 80, I bring down 0, the laſt Figure of the Dividend, and then there is 800 for a new Dividual; then you muſt try how oft you can take 365 out of the ſaid Dividual 800, and the Number of Places being equal in both Diviſor and Dividual, to wit, 3, aſk how oft 3 in 8; anſwer twice; ſo put in the Quotient, and ſay twice 5 is 10, 0 and carry 1; and twice 6 is 12, and 1 is 13; 3 and carry 1; and twice 3 is 6, and one is 7; ſo there is 730 to be deducted from 800, and the Remainder is 70, as in the Work may be ſeen, *viz.*

```
365)30000(82
    2920.
     ---
      800
      730
      ---
     (70)
```

Thus it appears that the Nobleman hath Eighty-two Pounds *per Diem*, and 70*l.* over; which, if multiplied by 20, the Shillings in a Pound, would produce 1400 Shillings; which, if divided by the Diviſor, 365, there would come out 3*s.* a Day more, and there will be a Remainder of 305, which multiplied by 12, the Pence in a Shilling, produces 3660; which divided ſtill by 365, gives 10*d.* a Day more: So that 30,000*l.* a Year is 82*l.* 3*s.* 10*d.* a Day.

Once more, divide 46242 Gallons by 252, the Gallons in a Tun, thus ſet down:

```
252)46242(183
    252..
    ----
    2104
    2016
    ----
     882
     756
    ----
    (126)
```

In this Example, after Enquiry, I find that it will not go twice, therefore I ſet down 1 in the Quotient, and place 252 under 462 of the Dividend, and after Subtraction, the Remainder is 210; to which I bring down 4 from the Dividend, and the Dividual is 2104; and then ſeeking again, I find it will bear 8 Times, which placed in the Quotient, and the Diviſor 252 multiplied by it, the Product is 2016 to be ſubtracted from 2104; which being done, the Remainder is 88; to which 2 the laſt Figure of the Dividend, being brought down, there is 882, for the laſt Dividual; and then ſeeking again I find it will go 3 Times; and the Product of the Diviſor multiplied by 3, is 756; which ſubtracted from 882, there remains 126 for the true Remainder: So that by this Diviſion I find there are 183 Tuns in 46242 Gallons, and 126 Gallons remaining, or over and above, which being half of 252 the Diviſor, the Remainder is therefore half a Tun more.

When you have a Cypher or Cyphers in the Diviſor, in the firſt, ſecond, or third Place, &c. ſeparate ſuch Cypher or Cyphers, with a daſh of the Pen, from the reſt of the Diviſor; and alſo cut off as many Figures or Cyphers from the Right of the Dividend, as you cut off Cyphers from the Diviſor, and divide the remaining Figures towards the Left-hand, by the remaining ſignificant Figures of the Diviſor.

*Example.*

Divide 42952 Square Poles of Land by 160, the Square Poles in an Acre of Land.

```
16 | 0)4295 | 2(268
     32..
     ----
     109
      96
     ----
     135
     128
     ----
      (7)
```

Here the Cypher is cut off from the Diviſor, and 2 from the Dividend; then I aſk how oft 16 in 42; anſwer twice; then the 16's in 109, anſwer 6 Times; then the 16's in 135, anſwer 8 Times. So there are 268 Acres, and 7 remains; that is 268 Acres, $\frac{7}{16}$ or $\frac{72}{160}$ or almoſt half an Acre.

```
Divide 27 | 00)62746 | 20(2323 25/27 or 2520/2700
                54...
                 --
                 87
                 81
                 --
                  64
                  54
                  ---
                  106
                   81
                   --
                  (25)
```

In this Example two Cyphers are ſeparated from the Diviſor, and alſo two Places from the Dividend, and then 62746 is divided only by 27. See the Work.

When the Diviſor is 3, 4, 5, 6, or more Figures, there is a ſure and eaſy Way of performing the work truly, by making a Table of the Diviſor; which may be done by *Addition*, or by multiplying the Diviſor by 2, 3, 4, &c. Admit you are to divide 987654321 by 123456.

123456)987654321(8000 Times.
987648...

(6321)

Here having noted the Number of Figures in the Diviſor, which here is 6, I make a Point under the ſixth Figure, or Place of the Dividend, whereby 987654 becomes the firſt Dividual.

| | |
|---|---|
| 1 | 123456 |
| 2 | 246912 |
| 3 | 370368 |
| 4 | 493824 |
| 5 | 617280 |
| 6 | 740736 |
| 7 | 864192 |
| 8 | 987648 |
| 9 | 1111104 |

The foregoing Table is made by doubling the firſt Line, which makes 246912; this added to the firſt or uppermoſt line, gives the 3d line 370368; which alſo added to the ſaid firſt line, makes 493824 for the 4th line, or product; and ſo of the reſt; ſtill remembering to add the ſubſequent line or product to the firſt or uppermoſt line, till you come to the laſt line of 9 times, which is 1111104; the truth of which may be proved by multiplying the firſt or uppermoſt line by 2, 3, 4, 5, &c. and if you commit an error by *Addition* it may be found or corrected by *Multiplication.*

### *The Uſe of the ſaid Table.*

When you have pointed out your number of places in the Dividend, caſt your eye on the table, and at the firſt view you may know how many times you can take, as in this example 7 times is too little, and 9 times too much; wherefore I ſet down 8 in the Quotient, and place 987648, the tabular number which ſtands againſt 8 under the Dividual, then I ſubtract that number from the Dividual, and the remainder is 6, to which I bring down 3, and place 0 in the Quotient; then to the 63, I bring down 2, and place o in the Quotient; then to 632, I bring down 1, the laſt Figure of the Dividend; but ſtill it will not bear any Times or Time, wherefore I put another o in the Quotient, and ſo the work is done, and the Quotient is 8000, and the remainder 6321, as in the Work.

Thus having plainly, fully, and pertinently ſhewn by verbal Directions, the Method of working Diviſion, I think it unneceſſary to give any more Examples in that Manner, but ſhall leave ſome few Examples, for practice ſake, whoſe Quotients and Remainders are expreſſed, but the Operation omitted, to ſave room, and for Trial of the ingenuity of Practitioners.

7400690042 divided by 987, the Quotient is 7498166, and the Remainder 200.

479679002742 divided by 4689 the Quotient is 102298784, and the Remainder 4566.

7969767002 divided by 976294, the Quotient is 8163, and the Remainder 279080.

456789012345 divided by 9876543, the Quotient is 46249, and the Remainder 8775138.

76469749 by 4500, Quotient 16993, and the Remainder 1249. And 8092320000 by 345000, Quotient 23456, and remains (0)

### *The Proof of Multiplication and Diviſion.*

THESE two Rules reciprocally prove each other; for in proving *Multiplication*, if you divide the Product by the Multiplier, the Quotient will be like the Multiplicand; or if by the Multiplicand, the Quotient will be the ſame with the Multiplier.

*Ex.* No. I.

345
24

1380
690

24)8280(345
72..

108
96

120
120

(0)

*Ex.* No. II. Or thus,

345)8280(24
690..

1380
1380

(0)

### *To prove Diviſion.*

Diviſion may be proved by Diviſion thus:

If you divide the Dividend by the Quotient, the Quotient will be your former Diviſor.

### *Example.*

Divide 8280 by 345.

345)8280(24

Here the working again is needleſs, it being in the Page foregoing; and ſhews the truth of the aſſertion, that *Diviſion* may be proved by Diviſion as aforeſaid.

But the moſt uſual Way of proving *Diviſion* is by *Multiplication* in this Manner, *viz.* multiply the Quotient by the Diviſor and the Product will be equal to the Dividend. See the Example No. 1, in the foregoing Page.

345 *Quotient.*
24 *Diviſor.*
———
1380
690
———
8280 *Proof.*
———

*Note* That when there is any Remainder, ſuch Remainder muſt be taken in, or added to the Product.

As in *Multiplication* I gave ſome Examples of its utility in Money, ſo likewiſe I ſhall give a few Examples in *Diviſion of Money*; whereby may be ſeen how expeditiouſly Things may be done without having recourſe to Reduction, the Rule of Three, *&c.* viz.

### *Example* 1.

Divide 26*l.* 12*s.* 6*d.* equally among five Men. For diſpoſition of working, ſet it down as follows:

| | *l.* | *s.* | *d.* |
|---|---|---|---|
| 5) | 26 | 12 | 6 |
| | 5 | 6 | 6 |
| | | | 5 |
| *Proof* | 26 | 12 | 6 |

In the working of this, I ſay, the 5's in 26, 5 times; 5 times 5 is 25, from 26, and there remains 1, that is 1 pound, or 20 ſhillings; which with the 12*s.* in the place of ſhillings, makes 32*s.* then the 5's in the 32, 6 times; 6 times 5 is 30, from 32; and there remain 2*s.* or 24*d.* which with 6*d.* in the place of pence, makes 30; then the 5's in 30, 6 times; and ſo the work is done, and the Anſwer is, that each Man muſt have

5*l.*

*l.* 5 6 6, for his equal ſhare in the ſaid diviſion of *l.* 26 12 6 among five perſons; and the truth of it is proved by multiplication of money, ſufficiently ſhewn in the Rule of Multiplication; as here, 5 times 6 is 30, 6 and carry 2; and 5 times 6 is 30, and 2 is 32; 12 and carry 1; and 5 times 5 is 25, and 1 is 26, *&c.*

*Example 2.*

Divide the charges of a country feaſt, amounting to *l.* 246 13 4 equally among 12 ſtewards to know what each ſteward muſt pay.

| | *l.* | *s.* | *d.* |
|---|---|---|---|
| 12) | 246 | 13 | 4 |
| *Anſwer* | 20 | 11 | $1\frac{4}{12}$ |

Here I ſay the 12's in 24 twice, and 12's in 6, 0 times, and there remains 6*l.* or 120*s.* and 13*s.* make 133; and then the 12's in 133 are 11, and there remains 1*s.* or 12*d.* and then 12 and 4 is 16; and the 12's in 16 once, and 4 remain; ſo that each ſteward muſt pay *l.* 20 11 $1\frac{4}{12}$ or four twelfths of a penny, ſomething more than a farthing; and this may be proved as that above.

When any quantity is ſuch a number that any two digits of the *Multiplication Table,* multiplied together, make the ſaid quantity or number, then the Quotient may be very expeditiouſly found at two diviſions, and ſooner than at one. *Example:* Divide 7872 by 32. In this example, the component parts, which, multiplied together, make the Diviſor 32, are 4 and 8, or 8 and 4; for it matters not which of them you divide by firſt; for either way will give a true and the ſame Quotient; as may be ſeen by the different methods of the following work.

| | | |
|---|---|---|
| 4)7872 | Or thus, | 8)7872 |
| 8)1968 | | 4)984 |
| 246 *Quotient.* | | 246 *Quotient.* |

Here though the operations are divers, yet the *Quotients* are one and the ſame. Again, divide 44184 by 56.

*Example* 3.

7)44184.

8)6312

789 *Quotient*.

Here the *Diviſors* are 7 and 8, or 8 and 7; for either, or both, will give the ſame *Quotient*.

And thus may above forty Examples be wrought by numbers out of the *Multiplication Table*, with great diſpatch and expedition, as by 15, 18, 25, 35, 64, 72, 96, *&c.*

When it happens that there is any remainder in the firſt diviſion, or the laſt, or both, to know the true remainder, as if you divided by the common way, take this method, *viz.* multiply the firſt diviſor by the laſt remainder, and take in, or add the firſt remainder, if there be any, and the product will be the true or ſame remainder, as if you divided by the long way. *Example:* divide 4567 by 15.

3)4567

5)1522 1

304 2

(7)

Here I multiply 3, the firſt diviſor, by 2, the laſt remainder, and take in 1, the firſt remainder, and it makes 7 for the true remainder, as may be proved at leiſure by the other way.

The ſame method may be taken with reſpect to component parts in diviſion of money, as in diviſion of ſimple numbers.

*Example* 4.

*l.* *s.* *d.*

*Divide* 3)463 18 6 into 18 equal parts.

6)154 12 10

*Anſwer* 25 15 5 $\frac{4}{6}$

By this method of *diviſion of money* (if the Quality be, as aforeſaid, made by even component parts) you may, by having the price of ſeveral things, know the price or value ue of one thing, at the ſaid rate, as well as by the *Rule of Three:* ſo doth *Multiplication of Money* anſwer queſtions in the *Rule of Three*, when the firſt number is a unit, or one.

*Example by Diviſion.*

| | | *l.* | *s.* | *d.* | |
|---|---|---|---|---|---|
| If 84*lb.* of Coffee coſt | 7) | 31 | 10 | 0 | what coſts 1*lb?* |
| | 12) | 4 | 10 | 0 | |
| *Anſwer* | | 0 | 7 | 6 | |

As in the Multiplication of money, to have an anſwer, you multiply the price by the quantity, ſo in diviſion of money, you divide the price by the quantity, to have your anſwer.

I could ſpeak more largely, if I had room, of the excellent uſes that may be made of *Multiplication* and *Diviſion* only; but their various uſes will be better underſtood by their application in the following rule of *Arithmetic*, particularly in the next rule, called

## *REDUCTION*;

WHICH is an Application of *Multiplication* and *Diviſion*, ſhewing how to reduce numbers of one denomination to another, thereby diſcovering the ſame value, though in different terms.

1. As firſt, all great numbers are brought into ſmaller by Multiplication, as pounds into ſhillings, pence, or farthings, by multiplying by 20, 12, or 4. Or hundreds weight into pounds weight, by multiplying by 4 and by 28, or by 112; or lower, into ounces or drams, by multiplying by 16 and 16.

2. And on the contrary, all ſmall names are brought into greater by Diviſion; as farthings into pounds, by dividing by 4, 12, and 20; and pounds weight into hundreds weight, by dividing by 28 and 4; the drams into pounds by dividing 16 and 16.

*But you may note,* That pounds are brought into pence, by multiplying by 240; or into farthings by multiplying by 960; and juſt the contrary by Diviſion.

The ſenſe, meaning, and uſe of *Reduction* is expreſſed in the following verſes:

Reduction *ſhews how we of names in uſe,*
*May great to ſmall and ſmall to great reduce:*
*So that the Anſwer which ſhall thence ariſe,*
*The given ſum in value equalize;*
*Multiply, or divide it, back you muſt;*
*Which makes again your given number juſt.*

*Example* 1.

In 240*l.* ſterling how many pence?

| | *Or thus:* |
|---|---|
| 20 ſhillings 1 pound. | |
| 4800 ſhillings in 240*l.* | 240*l.* |
| 12 pence 1 ſhilling. | 240*d.* in a *L.* |
| *Anſ.* 57600 pence in 240*l.* | 9600 |
| | 480 |
| | *Anſwer* 57600 |

*Example* 2.

In 226 tons of copper, how many pounds wt.

| | *Or thus:* |
|---|---|
| 20 C. 1 Ton. | |
| 4520 Hund. wt. in 226 Tons. | 226 Tons. |
| 4 qrs. 1 C. | 20 |
| 18080 qrs. of a C. wt. in 226 Tons | 4520 |
| 28 lb. 1 qr. of a C. | 112 |
| 144640 | 54240 |
| 36160 | 4520 |
| 506240 pounds wt. in 226 Tons | 506240 pounds. |

Theſe foregoing Examples are great names to be brought into ſmall (as may eaſily be obſerved and underſtood) therefore as the rule directeth, it is done by multiplication, by multiplying the greater name by the number of the next leſſer name that makes one of the ſaid greater; as in the firſt example the leſſer name to pounds is ſhil-

lings;

ings; wherefore I multiply by 20, becauſe 20 of that eſſer name makes one of the ſaid greater name, *i. e.* 20 hillings make a pound. And the ſame regard is had, nd method obſerved, in the example of weight as is very lain to be ſeen in the work, and is called *Reduction Deſcending*, becauſe it brings higher or greater denominaions into lower or leſſer.

*Example* 3. Bring

4)494400 farthings into pounds.

12)123600 pence

| 0)1030 | 0 ſhillings

515 pounds

*Or thus:*

```
96 | 0)49440 | 0(515l.
      480..
      ----
       144
        96
      ----
       480
       480
      ----
       (0)
```

In this way I divide by 960 the farthings in a pound, &c.

In the firſt way I divide the farthings by 4, becauſe 4 f them make a penny, and the Quotient is pence; then heſe pence I divide by 12, becauſe 12 of them make a hilling and that quotient is ſhillings; which ſhillings I ivide by 20 to bring them into pounds, thus: I cut off he cypher in the Dividend towards the right, for the ypher that is in the Diviſor 20, which is alſo ſeparated rom 2 with a daſh of the pen (as may be ſeen in the work;) hen I halve the figures one by one, as they are united ith the remainder in the Dividend; which half is pounds, nd is a ſhort way of dividing by 20; in the example I ſay he half of 10 (becauſe I muſt not ſet down 0 at the beginning) is 5, and the half of 3 is 1, but there remains 1, hich makes the next, which is 0, 10; and the half of 10 5; ſo that 10300 ſhillings make 515 pounds, or there e ſo many pounds in 494400 farthings.

*Note,* In dividing by 20, as above, if any thing remains, muſt be joined or annexed to the figure or cypher cut f; as ſuppoſe there had in the halving the laſt figure xcepting what you cut off) remained 1; then that 1 muſt have been joined to the cypher ſeparated or cut off, and there would have been 10 ſhillings.

*Example* 4.

Reduce 27552 pounds weight into hundreds wt.

4)
28) 27552 (984
252..
246 Cwt. *Anſwer*
235
224
112
112
(0)

*Or thus:*
lb. Cwt.
112)27552(246 *Anſ.*
224..
515
448
672
672
(0)

In the firſt of the two foregoing Examples, I divide the pounds by 28 to bring them into quarters; then I divide thoſe quarters by 4 to bring them into hundreds weight, as in the work.

In the ſecond way, I divide the pounds weight by 112, the pounds in a C. weight, and it brings the pounds weight into hundreds weight at once.

The ſaid Examples are of ſmall denominations to be brought into greater; and therefore according to the ſecond rule of Direction, it is done by Diviſion, by dividing the leſſer name by as many of them as make the next greater name: that is by 28, becauſe 28 of them make one of the next greater name, *viz.* a quarter of an hundred, and this reduction is called *Reduction Aſcending*, becauſe it brings low or ſmall names to higher or greater denominations; by which may be obſerved, that all queſtions in Reduction, whether aſcending or deſcending, are anſwered either by Multiplication or Diviſion, or by both; as will plainly appear in the ſundry examples of reducing of divers denominations to others.

When it is required to reduce numbers of ſeveral denominations by *Reduction Aſcending*, or by *Multiplication*, you are to work as before; but you muſt always remember to take in ſuch numbers as ſtand in the place of the next inferior denomination, as when you multiply the pounds by 20, if there be any ſhillings to the denomination, or place of ſhillings, you muſt take them in; ſo likewiſe when you multiply the ſhillings by 12, if there be any pence in the place of pence, you muſt alſo take them in; and ſo when you multiply the pence by 4, to bring them into farthings, you muſt take in the farthings, if there be any, in the place of farthings, as in the following work.

### *Example* 5.

*l.* *s.* *d.*
In 346 16 9½ how many farthings?
20 ſhillings 1 pound.

6936 ſhillings in 346*l.* 16s.
12 pence 1 ſhilling.

83241 pence in 346*l.* 16*s.* 9*d.*
4 farthings 1 penny.

332966 farthings in 346*l.* 16*s.* 9*d*½.

The example is ſo plain in the work, that it hardly needs any explication; but I begin to ſay 0 is 0, but 6 in the Units of ſhillings is 6; then twice 6 is 12, and one in the tens of ſhillings is 13, 3 and carry 1; and twice 4 is 8, and 1 is 9, and twice 3 is 6; then by 12, ſaying 12 times 6 is 72, and 9*d.* (in the place of pence) is 81, 1 and carry 8; and 12 times 3 is 36, and 8 is 44, 4 and carry 4; and 12 times 9 is 108, and 4 is 112, 2 and carry 11; and 12 times 6 is 72, and 11 is 83, &c.

### *Example* 6.

*C.* *qrs.* *lb.*
In 56 2 16 of Tobacco, how many pounds Weight?
4 qrs. 1 C. 2 qrs.

226 qrs. in 56 C. 2 qrs.
28 lb. 1 qr. of a C.

1814
453

*Anſ.* 6344 pounds wt. in 56 *C.* 2 *qrs.* 16*lb.*

In the foregoing Work, I muſt multiply the 56 *C.* by 4 and take in two Quarters; and then I multiply the 226 qrs. by 28, ſaying 8 Times 6 is 48, and 6 (the Unit Figure in the odd Pounds) is 54, and carry 5, &c. Then I multiply by 2, ſaying twice 6 is 12, and 1 (that ſtands in the Place of Tens in the odd Pounds) is 13, 3 and carry 1, &c. Then adding the two Products together, they make 6344 Pounds, contained in 56 *C.* 2 *qrs.* 16*lb.* as in the Work is conſpicuous. Or the Example may be ſooner done by multiplying the 56 *C.* by 112, the Pounds in a C. Wt. and taking in the odd Weight, *viz.* 2 *qrs.* 16*lb.* or 72 Pounds at once.

```
    C.
    56
   112
  ----
   672
 56,72 odd Wt.
  ----
  6344
```

I ſay here, 12 Times 6 is 72, 2 and carry 7; and 12 Times 5 is 60, and 7 is 67; then once 6 is 6, ſetting it down in the third Place, becauſe by multiplying by 12 at once, two Places are taken up. See the Work.

Or ſtill briefer thus, by ſetting down the 56 *C.* four ſeveral Times in the following Manner, taking in the odd Weight as before.

```
   56 C.
   56
  56
 56,72
 -----
```

The ſame as above, *viz.* 6344 Pounds.

### *Reduction Aſcending*

Is the bringing Numbers from a leſſer Denomination to a greater, and is the Reverſe of *Reduction Deſcending*; and each may ſerve as a Proof to the other, one being performed by *Multiplication*, and the other by *Diviſion*.

*And note*, That when at any Time in *Reduction Deſcending* you take in, or add to, the odd Money, Weight, or Meaſure, as you multiply the ſeveral Denominations, ſuch Quantities will be the Remainders in *Reduction Aſcending*.

*Examp*

4) *Examples by the two foregoing Sums.*

In 332966 Farthings, how many Pounds?

12)83241—½*d.* remains what taken in.

2,0)693,6—9*d.* remains what taken in.

346—16*s.* remains what taken in.

So that in 332966 Farthings there are 346*l.* 16*s.* 9*d.*½, and is a ſure Proof of the foregoing Work deſcending.

Again, in 6344 Pounds Weight, how many Hundreds Weight?

4)

28)6344(226 *qrs.*

56..

74 56 *C.* 2 *qrs.* taken in.

56

184

168

(16) remain Pounds taken in.

So that in 6344 Pounds Wt. there is 56 *C.* 2 *qrs.* 16*lb.* and proves the foregoing Examples deſcending to be right.

Now follow promiſcuous Examples of both Kinds of Reduction, one proving the other.

In 276*l.* 12*s.* how many Pence?

20

12

5532 In 66384*d.* how many Pounds?

12 2 | 0)553 | 2

*Anſ.* 66384*d.* *Anſ. l.* 276 | 12 and *Proof.*

In 47964 Grains, how many Pounds *Troy*?

2 | 0)

24)47964 (199 | 8

24... 12)99 18 Pwts.

239 In 8*lb.* 3 *oz.* 18 *pw.* 12 *gr.* *Queſt.* How many [Grains?

216 12

236 99

216 20

204 1998

192 24

*Gr.* (12) 7994

3997

*Anſwer* 47964 and *Proof.*

In 34 C. $\frac{3}{4}$ of Cotton Wool, how many pounds?

34
34
3484

3892 pounds.

112)3892(34 *C.* $\frac{3}{4}$ *Proof.*
336

532
448

(84) *lb.* or $\frac{3}{4}$ of a *C.*

In 456 *C.* 3 *qrs.* 27 *lb.* of Copper how many pounds; and what comes it to, at 21*d. per lb.*?

456 *C.*
456
456
456
111

51183 pounds.
21*d. per lb.*

51183
102366

1074843 pence; which bring into pounds by *Diviſion* or *Reduction Aſcending*, as before ſhewn and it will amount to 4478*l.* 10*s.* 3*d.*

*Or thus:*
*C.*
456
112

5472
456
,111

51183 Pounds.

Bring 4796 Ells *Flemiſh* into Ells *Engliſh*; multiply by 3 and divide by 5, becauſe 3 quarters make an Ell *Flemiſh*, and 5 an Ell *Engliſh*.

4796
3

5)14388

2877$\frac{3}{5}$

Reduce 456 Ells *Engliſh* into Yards; multiply by 5, and divide by 4, thus:

456 *Engliſh* Ells.
5 *qrs.* 1 *Eng.* Ell.

4)2280 qrs.

Yds. 570 *Anſwer.*

In 570 Yds. how many *Eng. E.*
4 qrs. 1 Yd.

5)2280

*Engliſh* Ells 456 *Anſwer* and *Proof.*

Bring 130 Tuns of Wine into Gallons.

| | |
|---|---|
| 4 Hogſheads 1 Tun. | *Or thus:* |
| 520 | 252 Gallons 1 Tun. |
| 63 Gallons 1 Hogſhead | 130 Tuns. |
| 1560 | 7560 |
| 3120 | 252 |
| *Anſ.* 32760 Gallons. | 32760 |

*Laſts.* *Quarters.* *Buſhels.* *Pecks.*

Reduce 42——3——5——2 into Pecks.

10 qrs. 1 Laſt.

423

8 Buſhels 1 *qr.*

3389

4 Pecks 1 Buſhel.

13558 Pecks in 42 Laſts, 3 qrs. 5 Buſhels, and 2 Pecks.

Here I multiply by 10, and take in 3 *qrs.* and then by 8 and take in 5 *Buſhels*; and laſtly, by 4, and take in 2 *Pecks.*

4)

In 13558 Pecks, how many Laſts, &c.

8)3389 2 Pecks taken in.

1|0)42|3 5 Buſhels taken in.

*Laſts* 42 3 Quarters taken in.

*Anſwer* 42 Laſts, 3 Quarters, 5 Buſhels, and 2 Pecks.

By *Reduction* alſo

Foreign Coins or Exchanges may be reduced to Sterling Money, and on the contrary, Sterling Money to Foreign.

*Example.*

Reduce 246 *Venetian Ducats de Banco* into Sterling Money, the Exchange at 52*d.* Sterling *per* Ducat, thus:

246
52

492
1230

12)12792

2 | 0)106(6

£. 53—6 To be paid in *London,* for the 246 Ducats drawn in *Venice.*

Reduce 53*l.* 6*s.* Sterl. into Ducats at 52*d.* Sterl. *per* Du.
20

1066
12

52)12792(246 Ducats to be paid in *Venice* for 53*l.* 6*s.* drawn in *London.*
104

23, &c.

To reduce *Flemiſh* Money into *Sterling* Money, divide the pence *Flemiſh* by the courſe of Exchange, ſuppoſe 33*s.* 4*d.* and the Quotient will be the *Sterling* Money; and what remains, multiply by 20, &c.

*Example.*

In 242*l.* 13*s.* 4*d.* *Flemiſh,* how many Pounds *Sterling,* &c.
20

33*s.* 4*d.* *Flemiſh* 4853
12 12

400 4 | 00)582 | 40

145 Remains 240
20
4 | 00)48 | 00

12

Anſwer 145*l.* 12*s.*

By the work it appears, that 145*l.* 12*s.* *Sterling*, anſwers, or is equivalent to 242*l.* 13*s.* 4*d.* *Flemiſh*, at 33*s.* 3*d.* *Flemiſh per* Pound *Sterling*.

Thus *Flemiſh* Money may be reduced to *Sterling* Money, though the Courſe of Exchange may be at any other Rate of Shillings and Pence *Flemiſh*; but when the Rate above, *viz.* 34*s.* 4*d.* then the Anſwer is ſooner found by multiplying by 3, and dividing by 5; for 400*d.* *Flemiſh* is the ſame to 240*d.* *Sterling*, (each being a Pound) as 5 is to 3, for if you divide 400 by 5, it quotes 80; ſo 240, divided by 3, quotes the ſame.

The foregoing *Example* done by the laſt propoſed Way.

*l.*242 13 4 *Flemiſh.*
3

5)728 0 0

*l.* 145 12 0

*Note*, *French* Money is reduced to *Sterling*, viz. *Livres*, *Sols*, and *Deniers* (or *French* Pence) as *Sterling* and *Flemiſh* Money is, by multiplying by 20 and 12.

In 426 *French* Crowns, each 54*d*¼ *Sterling*, how many Pounds *Sterling?*

426
54

1704
2130
106$\frac{2}{4}$ or ½

12)23110 ½

2 | 0)192 | 5 10*d.*

Anſ. *l.* 96 : 5 : 10*d.* ½

In this Example the Number of Crowns is multiplied by 54*d.* and for the ¼*d.* I take the 4th Part of 426, which is 106 $\frac{2}{4}$ of a Penny, or a Halfpenny, which added to the other Pence gives for Total 23110*d.* which divided by 12, quotes 1925, and 10*d.* remains: ſo the Anſwer is 96*l* 5*s.* 10*d.* ½ *Sterling*, as in the Work.

Again, bring 1600 Pieces of Eight, at 45*d.* ¼ *Sterling*, into Pounds *Sterling*.

1600
54

6400
8000
400

12)86800 Pence.

2 | 0)723 | 3—4

*l.* 361 : 13 : 4

Here the 1600 Pieces of Eight are multiplied by 54, to bring them into Pence, and for the $\frac{1}{4}$ I take the $\frac{1}{4}$ of 1600, &c. as in the Work; and the Anſwer is *l.* 361 : 13 : 4.

This Method is of Uſe in reducing the Exchanges of *Cadiz*, *Leghorn*, and *Genoa*. Or when the Exchange is at ſo many Pence and Eights of a Penny, (as often the Exchanges run) then multiply the given Number to reduce it into Pence, by the Pence contained in a Piece of Eight; and alſo multiply the ſaid given Numbers apart, by the Numerator or upper Figure of the Fraction, and divide by the Denominator or under Figure of the Fraction, and the Quotient will be Pence; which add to the other Pence produced by multiplying the given Number by the Pence contained in one of the Pieces for Exchange, then divide the Total Pence by 12, &c.

*Example.*

Bring 296 Dollars at 52*d.* $\frac{5}{8}$ *Sterling* into Pounds *Sterling.*

296
52

592
1480

15392
185

12)15577

2 | 0)129 | 8 : 1

Anſwer *l.* 64 : 18 : 1

296 Dollars.
5

8)1480

185

*Sterling* Money due for 296 Dollars, at 52*d*$\frac{5}{8}$ *Sterling per* Dollar.

But *Ducats, Dollars, Crowns, Millreas,* &c. are more expeditiouſly caſt up by the Rules of Practice hereafter to be ſhewn.

And ſo much for *Reduction.* The next Rule in *Arithmetic* is

## *The* GOLDEN RULE, *or* RULE OF THREE.

IT is called the *Golden Rule* from its excellent Performance in *Arithmetic,* and in other Parts of *Mathematical* Learning.

And it is called the *Rule of Three,* becauſe from three Numbers given, propoſed, or known, we find out a fourth Number required or unknown, which bears ſuch Proportion to the third, as the ſecond doth to the firſt Number; from whence alſo it is called the *Rule of Proportion.*

And of this *Proportion* there are two Sorts; one called *Direct,* and the other *Indirect* or *Reverſe.*

*Direct Proportion* is when the ſecond and third Numbers are to be multiplied together, and their Product divided by the firſt.

*Indirect* or *Reverſe Proportion,* is when the firſt and ſecond Numbers are to be multiplied together, and their Product divided by the third.

In *Direct Proportion,* the fourth Number, or Anſwer to the Queſtion contains the third Number as often (or as many Times) as the ſecond contains the firſt.

But in *Indirect Proportion,* the greater the third Number is, the leſs is the fourth; and the leſſer the third number is, the greater is the fourth.

### *The Stating the Queſtion.*

The chief Difficulty that occurs in the *Rule of Three,* is the right placing the Numbers, or ſtating the Queſtion; for when that is done, you have nothing more to do, but to multiply and divide, and the Work is done.

And to this End, we are to remember, that of the three given Numbers, two of them are always of one Name or Denomination, and the other Number is ever of the ſame Name with the fourth Number or Anſwer required; and muſt always be the ſecond or middle Number: And the Number that aſketh the Queſtion, muſt ſtill poſſeſs the third or laſt Place, and the other Number of the ſame Name with the third, muſt be the firſt Number; for the firſt and third Numbers muſt always be of one name, *viz.* both Money, both Weight, both Time, or both Meaſure. And though they be of one Kind, yet if one of them is altered, by *Reduction,* from a higher to a lower Name, then the other muſt be reduced to the ſame Name. For you muſt particularly Note, *That if either the firſt or third Number conſiſt of ſeveral Denominations, that is, of Pounds and Shillings; or Pounds, Shillings, and Pence; or of Pounds, Shillings, Pence, and Farthings; or of Tons, Hundreds, Quarters, and Pounds,* &c. *then muſt they be reduced to the loweſt Name mentioned. And if any one happens to be of divers Denominations, and the other but of one Name; then the Number of one Name muſt be reduced as low, or into the ſame Name with the other. As ſuppoſe the firſt Number is brought into Farthings, then the third Number, though but Pounds, muſt be brought into Farthings alſo. Then you are to multiply the ſecond and third Numbers together, (when the Proportion is Direct) and divide the Product by the firſt Number, and the Quotient thence ariſing will be the Anſwer to the Queſtion, and in the ſame Name with the middle Number: And if in the ſmall Denomination, it muſt be brought by Diviſion to the higheſt Name for the better underſtanding the Anſwer.* You muſt alſo Note, *That if the middle Number be of ſeveral Denominations, it muſt be brought into the loweſt mentioned.*

*Example* 1.

If 12 Gallons of Brandy coſt 4*l.* 10*s.* what will 134 Gallons coſt at that Rate?

Stated for working thus

*Gallons.* *l.* *s.* *Gallons.*
If 12——4 10——134
20 90
90 12)12060
2|0)100|5
£.50|5

Here the firſt and third Numbers are of like Names, *viz.* both Gallons; and 134 being the Number that aſked the Queſtion, it hath the third Place, as it always muſt, as before aſſerted; and 4*l.* 10*s.* the ſecond Number, being of two Denominations, *viz.* Pounds and Shillings, it is reduced into the loweſt mentioned, *viz.* Shillings, as before directed, and then the three Numbers are theſe, *viz.* 12—90—134; and 134 the third Number being multiplied by 90, the ſecond Number, produces 12060; which divided by 12, the firſt Number quotes 1005, which are Shillings, becauſe 90, the middle Number, were Shillings; and 1005 Shillings, divided by 20 give 50*l.* 5*s.* for the Anſwer; and for the Proof of its Truth, ſtate it back again thus:

*Example.*

*Gal.* *l.* *s.* *Gal.*
If 134 coſt 50—5 what 12?
20
——
1005
12
——
134)12060(90*s.* *Anſwer,* or 4*l.* 10*s.* the
1206
——

Coſt of 12 Gallons, and is a ſure Proof of the firſt Work; and the Back ſtating and working the Proof is as much a Queſtion in the Rule of Three as the firſt.

By the foregoing Rule and Directions, and theſe two Operations, you may underſtand the Nature of the Rule, and Method of working; and with Eaſe and Certainty anſwer any Example propoſed in the Rule of Three Direct; and therefore I ſhall omit what I can of verbal Directions, and abate as much of Figure Work as is conſiſtent with Diſpatch, and of not leaving the Work too obſcure, to ſave Room, and not to be too prolix; and to this End I ſhall only give the Examples ſtated, and a little of the Work, and the Anſwers to the Queſtions, leaving moſt of the Operations to be performed by the ingenious Practitioners.

*Example* 3.

If 56*lb.* of Indigo coſt 11*l.* 4*s.* what will 1008*lb.* coſt at that Rate?

*lb.* *s.* *lb.*
If 56 224 1008? *Anſwer* 4032*s.* or 201*l.* 12*s.*

*Example* 4.

If half a C. Wt. of Copper coſt 4*l.* 18*s.* what Quantity will 14*s.* buy at that Rate?

*s.* *lb.* *s.*
If 98 buy 56, what 14? *Anſwer* 8*lb.* of Copper.

*Example* 5.

If 4 C. 3 qrs. Sugar coſt 5*l.* 15*s.* 7*d.* what will 4 Hogſheads come to, weighing 42 *C.* 1 *qr.* 14*lb.*?

If

*lb.* *d.* *lb.*

If 532—1387—4746? *Anſwer*, 12373 Pence, or 51*l.* 11*s.* 1*d.* And the Remainder, 266, multiplied by 4, gives 1064; which alſo, divided by the firſt Number, 532, gives a Halfpenny more; ſo the whole is 51*l.* 11*s.* 1*d.*$\frac{1}{2}$.

Any of theſe Examples, or any other, may be proved by a Back-ſtating, according as the firſt Example was proved; and each Proof becomes another Queſtion in the Rule of Three as was ſaid before.

*Example* 6.

If I have 50*l.* a Year Salary, how much is due to me for 144 Days Service at that Rate?

*Days.* *l.* *Days.*

If 365—50—144? *Anſwer*, 19—14—6$\frac{90}{365}$ Parts of a Penny.

In this Example, the Product of the third by the ſecond Number is 7200; which divided by the firſt 365 (according to the Rule) quotes 19 Pounds, the Name of the middle Number, and there is a Remainder of 265; which multiplied by 20, according to Reduction, and the Product ſtill divided by 365, there comes out 14 Shillings; and yet there is a Remainder of 190, which multiplied by 12, and the Product divided by 365, gives 6*d.* and there is a Remainder 90; which if multiplied by 4 (the laſt inferior Name) and divided by 365, yet would not come to a Farthing more; ſo that the Anſwer is as above *l.* 19—14—6$\frac{90}{365}$.

You are to note always, *That when any Thing remains that is reducible to an inferior, or lower Name, after multiplied as above, it muſt continually be divided by the firſt Number.*

Note alſo, *When the firſt of the three given Numbers is an Unit or One, the Work is performed, or Anſwer found, by Multiplication.*

*Example* 7.

If I am to give 17*s.* for 1*lb.* of *Belladine* Silk, what muſt I give for 264*lb.* at that Rate?

*lb.* *s.* *lb.*
If 1———17———264
17

---

*Anſwer* 4488*s.* or 224*l.* 8*s.*

*Example* 8.

If I buy 49 Bags of Hops at 12*l.* 12*s.* 6*d.* *per* Bag, what come they to at that Rate?

*Bag* l. s. d *Bags.*

1 ———— 12 12 6 ———— 49

7 and by 7

88 7 6

7

618 12 6

The foregoing Work is performed by the component Parts as taught in *Multiplication.*

When the third, or laſt of the three given Numbers is an Unit, or One, the Work is performed by *Diviſion.*

*Example* 9.

If 12 Ells of Holland coſt 3*l.* 6*s.* what is the Price of 1 Ell at that Rate?

Ells. 12) *s.* Ell.

If 12 ———— 66 ———— 1 *Anſwer* 5*s.* 6*d.*

$5\frac{6}{12}$ of 1*s.* or 6*d.*

*Example* 10.

If 56 Yards of Broadcloth coſt 40*l.* 12*s.* what comes a Yard to at that Rate?

Yds. 7) *l.* *s.* Yd.

If 56 ———— 40 12 ———— 1 *Anſ.* 14*s.* 6*d. per* Yard.

8) 5 16

0 14 6*d. Anſwer.*

This Example is wrought by *Diviſion of Money*, and by component Parts; as before taught in the *Rule of Diviſion.*

*Example* 11.

If *A.* owes *B.* 296*l.* 17*s.* and compounds at 7*s* 6*d.* in the Pound; what muſt *B.* take for his Debt?

*s.* *d.* *s.*

If 20 ———— 90 ———— 5937. *Anſwer l.* 111 6 $4\frac{1}{2}$

*Example* 12.

If a Gentleman hath an Eſtate of 500*l.* a Year, what may he expend daily, and yet lay up 12*l.* 15*s. per* Month?

Firſt multiply 12*l.* 15*s.* by 12, the Months in a Year, and it makes 153*l.* which deducted from 500*l.* the Remainder is 347*l.* Then ſay,

*Days.* *l.*
If 365———347, what 1 Day? *Anſwer* 19*s.*

After you have reduced the Pounds into Shillings which make 6940, you divide them by 365, and the Quotient is 19*s.* *per* Day.

### *The Rule of Three Inverſe, or of Indirect Proportion.*

WHAT *Indirect Proportion* is, has been hinted already.

In *Direct Proportion,* the Product of the Firſt and Fourth Numbers, is equal to the Product of the Second and Third.

But in this Proportion, the Product of the Third and Fourth Numbers is equal to the Product of the Firſt and Second.

The Method of ſtating any Queſtion in this Rule, is the ſame with that of the *Direct Rule.*

For the Firſt and Third Numbers muſt be of one Name, and ſo reduced, as in that Rule; and the Number that moves the Queſtion muſt poſſeſs the Third Place; and the Middle Number will be of the ſame Name with the Anſwer as it is there.

*To know when the Queſtion belongs to the* Direct, *and when to the* Reverſe Rule.

When the Queſtion is ſtated as aforeſaid, conſider whether the Anſwer to the Queſtion ought to be more or leſs than the Second Number; if more, then the leſſer of the Firſt and Third Numbers muſt be your *Diviſor.*

But if leſs, then the greater of the two extreme Numbers muſt be your *Diviſor.*

And if the Firſt Number of the Three is your *Diviſor,* then the *Proportion* is *Direct*; but if the laſt of the Three is your *Diviſor,* the *Proportion* is *Indirect* or *Reverſe.*

Or without Regard to *Direct* or *Reverſe.*

If more is required, the Leſſer } is the *Diviſor*
If leſs, the Greater }

*Examples*

### *Examples for Explanation.*

#### *Example* 1.

If 4 Men plane 250 Deal Boards in 6 Days; how many Men will plane them in 2 Days?

If 6 Days require 4 Men, what 2 Days? *Anſ.* 12. Men.

6
—
2)24
—
12 *Anſ.*
—

#### *Example* 2.

If a Board be 9 Inches broad, how much in Length will make a Square Foot?

In B. In L.
If 12————12, what 9 Inches broad?
12
—
9)144
—
*Anſwer* 16 Inches in Length.

In theſe Examples, the firſt and ſecond Numbers are multiplied together, and the Product is divided by the Third; for, in the firſt Example, it is moſt certain, that 2 Days will require more Hands to perform the Work than 6 Days; therefore the leſſer of the extreme Numbers is the *Diviſor*; and declares the Queſtion is in the *Indirect Proportion*.

Likewiſe, in the Second Example, 9 Inches in Breadth, muſt needs require more in Length to make a Foot, than 12 Inches in Breadth; wherefore it is in the ſame *Proportion* with the First Example, becauſe the *Diviſor* is the Third Number.

### *Example* 3.

How many Yards of Sarſenet, of 3 *qrs.* wide, will line 9 Yards of Cloth of 8 *qrs.* wide?

*Qrs. wide* *yds. long.* *qrs. wide.*
If 8——————9 what————3
8 Here the narrower the Silk, the more in Length is required.
——
3)72
——
Yards 24 *Anſwer.*

### *Example* 4.

If a Quartern Loaf weigh 4*lb.* $\frac{1}{2}$ when Wheat is 5*s.* 6*d.* the Buſhel, what muſt it weigh when Wheat is 4*s.* the Buſhel?

*d.* *Half lb.* *d.* *lb.*
If 66——————9——————48 *Anſwer* 6 $\frac{3}{8}$

### *Example* 5.

If in 12 Months 100*l.* Principal gains 5 Pounds Intereſt, what Principal will gain the ſame Intereſt in 5 Months.

*M.* *l. P.* *M.*
12——————100————5
12
——
5)1200
——
*Anſwer* 240*l.* Principal.

## *The Double Rule of Three Direct.*

IN this Rule there are Five Numbers given to find out a Sixth, which is to be in Proportion to the Product of the Fourth and Fifth Numbers, as the Third Number is to the Product of the Firſt and Second Numbers.

Queſtions in this Kind of *Proportion* are wrought either by two Operations in the *Single Rule of Three Direct*, or by the Rule compoſed of the Five given Numbers, and the one may be a Proof to the other; as may be ſeen in the Example following.

### *Example* 1.

If 100 Pounds Principal in 12 Months, gain 5 Pounds Intereſt, what will 246 Pounds Principal gain in 7 Months?

```
If 100 gain 5, what will 246
                           5
                     -------
             1 | 00)12 | 30
                         20
                     -------
             1 | 00) 6 | 00  Anſwer 12l. 6s.
              M.      l.      s.   M.
Then ſay again, if 12 gain 12   6 what 7
                          20
                        ----
                         246
                           7
                        ----
                     12)1722
                     -------
                 2 | 0) 14 | 3  6d.
                     ----------
                     l.  7   3  6d.
```

In the firſt Stating, the Anſwer is, that if 100*l.* gain 5 Pounds, then 246*l.* will gain 12 Pounds 6 Shillings.

Then I ſay in the next Stating, if 12 Months gain 12*l.* 6*s.* what will 7 Months? and the Anſwer is, 7*l.* 3*s.* 6*d.* And ſo much will 246 Pounds gain in 7 Months, if 100 Pounds gain 5 Pounds in 12 Months.

You muſt particularly note, That in all Operations where the Anſwer to the Queſtion is found by two Statings of the Rule of Three, the Anſwer of the firſt Stating is over the middle Number of the ſecond Stating; as in the preceding Example.

The foregoing Queſtion may be anſwered by a Stating compoſed of the 5 given Numbers, thus:

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | *l.* | *M.* | *l.* | *l.* | *M.* |
| If | 100 | 12 | 5 | 246 | 7 |

100
12
——
1200

246
7
——
1722
5
——
1200)8610 (7*l.*
8400
——
210
20
——
1200)4200 (3*s.*
3600
——
600
12
——
1200)7200 (6*d.*
7200
——
(0)

In this Work in Stating the Queſtion, the Firſt and Fourth Numbers are made of one Name, as are the Second and Fifth; then the two Firſt Numbers are multiplied together for a Diviſor, and the laſt Three Numbers are multiplied together for a Dividend, and the Quotient, or Anſwer, is of the ſame Name with the middle Numbers, *viz.* Pounds, Intereſt. In the Work I find the firſt Quotient 7 Pounds Intereſt: and ſo I proceed from one Denomination to another, till I find the ſame Anſwer as in the Work at two Statings, *viz.* *l.* 7 3 6

This Method of Operation ſerves to anſwer all Queſtions in the *Double Rule of Three Direct.*

### *The Double Rule of Three Reverſe.*

IN this Rule you muſt place your Numbers in ſuch Order that your Second and Fourth Number may be of one Name or Denomination, and your Third and Fifth.

*Example.*

If 100*l.* Principal, in 12 Months, gain 6*l.* Intereſt, what Principal will gain 20*l.* Intereſt in 8 Months?

Stated thus:

(1) *l. P.* — (2) *Mo.* — (3) *l. Int.* — (4) *Mo.* — (5) *l. Int.*

If 100 —— 12 —— 6 —— 8 —— 20

```
 100        8
  12        6
 ———        —
1200       48 the Diviſor.
  20
———————
48)24000(500l. Principal.  Anſwer.
   240
   ———
   (0)
```

In this Work, the Third and Fourth Numbers are multiplied together for a Diviſor; and then the Firſt is multiplied by the Second, and that Product by the Fifth Number, and the Product, 24000, is divided by 48, and the Quotient is 500*l.* Principal; which is the Anſwer to the Queſtion, as may be ſeen in the Work.

## *Rules of Practice.*

THESE Rules are ſo called from their frequent Uſe nd Brevity in caſting up moſt Sorts of Goods or Merchandize.

Note, *That any Queſtion in the Rule of Three, when the* *irſt Number in the Stating is* 1, *is more briefly done by theſe Rules, called* Practice.

But previous to theſe Rules, it is neceſſary to have the ollowing Tables by heart.

| *arts of a Shilling.* | | *Of a Pound.* | *Parts of a Pound.* | | |
|---|---|---|---|---|---|
| *d.* | | | *s.* | *d.* | |
| 6 | is $\frac{1}{2}$ | $\frac{1}{40}$ | 10 | 0 | is $\frac{1}{2}$ |
| 4 | $\frac{1}{3}$ | $\frac{1}{60}$ | 6 | 8 | $\frac{1}{3}$ |
| 3 | $\frac{1}{4}$ | $\frac{1}{80}$ | 5 | 0 | $\frac{1}{4}$ |
| 2 | $\frac{1}{6}$ | $\frac{1}{120}$ | 4 | 0 | $\frac{1}{5}$ |
| 1½ | $\frac{1}{8}$ | $\frac{1}{160}$ | 3 | 4 | $\frac{1}{6}$ |
| 1 | $\frac{1}{12}$ | $\frac{1}{240}$ | 2 | 6 | $\frac{1}{8}$ |
| | | | 2 | 0 | $\frac{1}{10}$ |
| | | | 1 | 8 | $\frac{1}{12}$ |
| | | | 1 | 0 | $\frac{1}{20}$ |

*Parts of a Shilling.* *Example* 1.

6*d* is $\frac{1}{2}$ of 1*s.* | 426 Pounds of Sugar, at 6*d per lb.*

2 | 0)21 | 3

*l.* 10 13 *Anſwer.*

Here 6*d*. being the Price of each *lb.* and the Half of a Shilling; therefore the Half of 426 is taken, and gives 213*s.* or 10*l.* 13*s.*

*Example* 2.

4*d.* is $\frac{1}{3}$ of 1*s.* | 512 *lb.* of Cheeſe, at 4*d. per lb.*

2 | 0)17 | 0 8*d.*

*l.* 8 10 8 *Anſwer.*

Here 4*d.* is $\frac{1}{3}$ of a Shilling; therefore the third Part of 512 is 170*s.* and $\frac{2}{3}$ of a Shilling, or 8*d.* remains.

Note, *Always that the Remainder is of the ſame Name with the Dividend, which here is Groats, for the Pounds of Cheeſ are at a Groat each.*

*Example* 3.

3*d.* is $\frac{1}{4}$ of 1*s.* | 246 Yards of Ribband, at 3*d per* Yard.

2 | 0) 6 | 1 6*d.*

*l.* 3 1 6 *Anſwer.*

Here the Yards are divided by 4, becauſe 3*d.* is the 4th of a Shilling, and it quotes 61 Shillings, and 2 remains, or two 3 Pences: So the Anſwer is, *l.* 3 1 6.

And thus may any propoſed Queſtion be anſwered, belonging to the firſt Table, or Parts of a Shilling; that is, by dividing the given Number by the Denominator of the Fraction, and the Quotient will be always Shillings, which (the Remainders being known as above) bring into Pounds, by dividing by 20, &c.

When the Price of the Integer is at a Farthing, a Halfpenny, or three Farthings more than the Value of the Pence mentioned, then for thoſe Farthings, take a proper Part of the foregoing Quotient found for the Pence, and add them together.

Exampl

*Examples.*

249 Ells of Canvas, at 4*d.* ½ *per* Ell.

4*d.* is ⅓ | 
½*d.* is ⅛ | 83
of 4*d.* | 10⅛ or 4*d.* ½

2.|0) 9|3 4½

*l.* 4 13 4½ *Anſwer.*

In this Example I divide by 3 for the Groats, as being the Third of one Shilling, and it quotes 83*s.* then I conſider that a Halfpenny is the Eighth of 4*d.* therefore I take the Eighth Part of the Groat Line, or 83*s.* and that produces 10*s.* and ⅜ of a Shilling, or 4*d.* ½; then the two Lines being added together, makes 93*s.* 4*d.* ½, or 4*l.* 13*s.* 4*d.* ½, as in the Work.

*Parts of a Pound.*

10*s.* is ½ | 254 Yards of Cloth, at 10*s.* *per* Yard.

*l.* 127 *Anſwer.*

Here the Half of 254 is taken, becauſe 10*s.* is the Half of a Pound.

*s.* *d.* 972 Gallons, at 6*s.* 8*d.* *per Gallon.*
6 8⅓ |

*l.* 324 *Anſwer.*

Here the third Part is taken, becauſe 6*s.* and 8*d.* is the third of a Pound; and the Anſwer is *l.* 324.

And thus may any Queſtion propoſed be anſwered, belonging to the ſecond Table, or Parts of a Pound; that is, by dividing the given Number by the Denominator of the Fraction, and the Quotient will always be Pounds; and if any Thing remains, it is always ſo many Halves, Thirds, Fourths, or Fifths, &c. of a Pound, according to the Denominator that you divide by.

If the Price be Shillings and Pence, or Shillings, Pence, and Farthings, and no even Part of a Pound; then multiply the given Number of the Shillings in the Price, and take even Parts for the Pence, or Pence and Farthings, and add the ſeveral Lines together, and they will be Shillings; which Shillings bring into Pounds as before.

*Examples.*

*lb.* *s.* *d.*
426 at 4 9
4
6*d.* $\frac{1}{2}$ | 1704
3*d.* $\frac{1}{4}$ | 213
106 $\frac{1}{2}$ or 6*d.*
2 | 0)202 | 3 6
*l.* 101 3 6 *Anſw.*

*Ells* *s.* *d.*
216 at 2 3$\frac{1}{2}$
2 *per* Ell.
3*d.* $\frac{1}{4}$ | 432
$\frac{1}{2}$*d.* $\frac{1}{6}$ | 54
of 3*d.* | 9
2 | 0)49 | 5*s.*
*l.* 24 15 *Anſw.*

396 Gallons of Brandy, at 7*s.* 9*d. per* Gallon.
7
2772
6*d.* $\frac{1}{2}$ of 1*s.* | 198
3*d.* $\frac{1}{2}$ of 6*d.* | 99
2 | 0)306 | 9
*l.* 153 | 9 *Anſw.*

When the Price is 10*d.* only; annex 0 to the Right of the given Number (which is multiplying by 10) and they are Pence; which divide by 12 and 20.

*Example*; 426*lb.* of Hops, at 10*d. per lb.*
12)4260
2 | 0) 35 | 5
*l.* 17 15 *Anſwer.*

When the Price is 11*d.* ſet down the Quantity twice in the Form of Multiplication, and add the two Lines together, then divide by 12 and 20.

*Example.*

426 *lb.* of Copper, at 11*d. per lb.*
426
12)4686 *Pence.*
2 | 0) 39 | 0 6
*l.* 19 10 6 *Anſwer.*

If the Price be 11*d.* ½ take Half the uppermoſt Line, &*c.*

*Example.*

942*lb.* of Tobacco at 11*d.* ½ *per lb.*

942
471

12)10833

2 | 0) 90 | 2 9

*l.* 45 2 9 *Anſw.*

When the Price is 1*s.* only divide by 20.

*Example.*

2 | 0)96 | 4*lb.* of Tobacco, at 12*d. per lb.*

*l.* 48 4 *Anſwer.*

When the Price is 2*s.* it is done at Sight, by doubling the laſt Figure towards the Right-hand, and ſetting it apart for Shillings; and the Figures towards the leſt are Pounds.

*Example.*

596 Gallons of Spirits, at 2*s. per* Gallon.

*l.* 59 12 *Anſwer.* Here the Double of 6 is 12, and the 59 are Pounds.

From this Method of working by 2*s.* a Multitude of Examples may be moſt expeditiouſly wrought, *viz.*

| | *Ells.*<br>444 Cambrick<br>at 5*s.* 9*d.* | *Yards.*<br>426 at 3*s.* 6*d. per*<br>Yard. |
|---|---|---|
| | 44 8 at 2*s.* | 42 12 at 2*s.* |
| | 44 8 at 2*s.* 1*s.* ½ 2*s.* | 21 6 at 1*s.* |
| 1*s.* ½ of 2*s.* | 22 4 at 1*s.* 6*d.* ½ 1*s.* | 10 13 at 6*d.* |
| 6*d.* ½ of 1*s.* | 11 2 at 6*d.* | |
| 3*d.* ½ of 6*d.* | 5 11 at 3*d.* | 74 11 at 3*s* 6*d.* |
| *Anſwer l.* | 127 13 at 5*s.* 9*d.* | |

The Operation of theſe two Examples is ſo intelligibly wrought, that there is no need of verbal Explanation.

Again, 548 Yards of Broad Cloth, at 12*s.* 6*d.* *per* Yard.

*l.* 54 16 at 2*s.*
6 Times 2 is 12*s.*

6*d.* is ¼ of 2*s.* | 328 16 at 12*s.*
13 14 at 6*d.*

Note, *That* 13*l.* 14*s.* is the *fourth Part of* 54*l.* 16*s.* *the two Shilling Line.*

*l.* 342 10 *Anſwer.*

Or multiply by 12*s.* and take Half of the given Number for the 6*d.* thus:

548 Yards.
12
6576
½) 274
2 | 0)685 | 0
*l.* 342 10 *Anſwer.*

When the Price is an even Number of Shillings, multiply the Numbers of Integers by Half the Price, and double the firſt Figure of the Product for Shillings, and carry, as is uſual in Multiplication, and the other Figures towards the Left will be Pounds.

*Example.*

296 Yards of Cloth, at 14*s.* *per* Yard.
7 the Half of 14*s.*
*l.* 207 4*s.* *Anſwer.*

Here 7 Times 6 is 42; the Double of 2*s.* is 4*s.* &c.

When the Price is an odd Number of Shillings, work for the even Number as above; and for the odd Shillings take the $\frac{1}{20}$ of the given Number, and add them together.

*Example.*

496 Gallons of Citron Water, at 17*s.* *per* Gallon.
8 Half of 16*s.*
*l.* 396 16*s.*
24 16.
*l.* 421 12 *Anſwer.*

In this Example I ſay, 8 Times 6 is 48, the Double of 8 is 16*s.* and carry 4; then 8 Times 9 is 72, and 4 is 76, 6 and carry 7; and 8 Times 4 is 32, and 7 is 39; then the Half of 4 is 2, *&c.*

I have not here Room to ſpeak of the various and almoſt infinite Methods and Rules of *Practice* (having ſeveral other Subjects and Things to treat on) but ſhall leave ſome general Rules, which, if heedfully noted, will be of great Uſe to Learners; and are theſe, *viz.*

1. When the Price is Parts of a Farthing, or of a Penny, and $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$, *&c.* then multiply the Integers by the Numerator, and divide by the Denominator, and the Reſult will be either Farthings or Pence; which reduce to Pounds, *&c.*

2. When the Price is Pence, and no even Part of a Shilling; as ſuppoſe 5*d.* 7*d.* 8*d.* or 9*d.* then it may be done by taking their Parts, as 3*d.* and 2*d.* is 5*d.* and 4*d.* and 3*d.* is 7*d.* and 4*d.* and 4*d.* is 8*d*, and 6*d.* and 3*d.* is 9*d.* but it is an eaſy and ſure Way to multiply the given Number by 5, 7, 8, or 9, then the Product is Pence, which reduce to Pounds by *Reduction.*

3. When the Price is Pence, and Parts of a Penny; as 1*d*$\frac{1}{4}$, 2*d*$\frac{1}{2}$, or 6*d*$\frac{3}{4}$, then work for the Penny by taking the $\frac{1}{12}$; for 2*d.* the $\frac{1}{6}$; and for 6*d.* the $\frac{1}{2}$: Then for the Farthing, take $\frac{1}{4}$ of the Penny Line, and for $\frac{1}{2}$, $\frac{1}{4}$, of the Two-penny Line; and for $\frac{3}{4}$, take $\frac{1}{8}$ of the Six-penny Line; then add the Reſults together, and the Total will be Shillings, which reduce to Pounds by dividing by 20. Or by the ſure Way of bringing the mixt Number into the loweſt Denomination; as 1*d*$\frac{1}{4}$, into 5 Farthings; 2*d*$\frac{1}{2}$, into 5 Halfpence, and 6*d*$\frac{3}{4}$, into 27 Farthings; then multiply the Integers by 5, and the Product is Farthings; or by 5 Halfpence, and the Product will be Halfpence; or by 27 Farthings, and the Product will be Farthings; which, whether Farthings, or Pence, reduce to Pounds, *&c.*

4. When the Price is Shillings and Pence, or Shillings, Pence, and Farthings; multiply the Integers by the Shillings of the Price, and take Parts of the Pence, or Pence and Farthings, *&c.*

5. If the Price be Pounds and Shillings, or Pounds, Shillings, Pence, and Farthings, multiply by the Shillings in the Price, that is, in the Pounds and Shillings, and take Parts for the Pence and Farthings.

6. When the Number of Integers hath a Fraction annexed, or belonging to them, as $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, *&c.* then take $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$, of the Price of one of the Integers, and add that to the other Reſults.

## *TARE and TRETT, &c.*

*Groſs Weight* is the Weight of the Goods in Hundreds, Quarters, and Pounds, with the Weight of the Hogſhead, Caſk, Cheſt, Bag, Bale, *&c.* that contains the Goods.

*Tare* is allowed to the Buyer for the Weight of the Hogſhead, Caſk, Cheſt, Bag, Bale, *&c.*

*Trett* is an Allowance made for Waſte, Duſt, *&c.* in ſundry Sorts of Goods, as Tobacco, Cotton, Pepper, Spices, *&c.* and is always 4*lb. per* 104*lb.* Suttle, and found by dividing the Suttle Pounds by 26, becauſe 4 Times 26 make 104*lb.* When the Groſs Weight is brought into Pounds, and before the Tare is deducted, they are called *Pounds Groſs*; and after the Tare is ſubtracted, the remaining Pounds are called *Pounds Suttle*, which divided by 26 (as ſaid before) quotes Pounds Trett, *&c.*

### *Tare at ſo much per Caſk, Hogſhead, Bag, &c.*

The Allowances for Tare are variouſly wrought, as by the following Examples:

In 12 Caſks of Indigo, containing 45 *C.* 1 *qr.* 14*lb.* Groſs, Tare 30*lb. per* Caſk, how many Pounds Nett?

12 — *C.* *qr.* *lb.*
45—1—14
360 Pounds Tare — 45
45
4542

5082 Pounds Groſs.
Subtract 360 Pounds Tare.

*Anſwer*, 4722 Pounds Nett.

In this Example, the *lbs.* Tare of one Caſk are multiplied by the Number of Caſks, and the Product is 360 Pounds Tare; and the Groſs Weight is reduced into Pounds by the Method ſhewn in Reduction of Weight; and then the Pounds Tare are deducted from the Pounds Groſs, and the Remainder is Pounds Nett, *viz.* 4722, as in the Work.

When the Tare is at ſo much *per Cwt.* multiply the Number of Hundreds by the Tare, and take Parts for the odd Weight, and add it to the Tare found by Multiplication, and divide it by 112 to bring it into Groſs Weight in order for Subtraction.

*Example.*

What is the Nett Wt. of 12 Caſks of Argol, wt. Groſs, 84 *C.* 2 *qrs.* 14*lb*?

14 Tare *per C.*

336
84
7 for half *C.*
1¾ for 14*lb.*

112)1184¾(10 *C.*
112

64*lb.* or half a *C.* and 8*lb.*

| *C.* | *qrs.* | *lb.* |
|---|---|---|
| 84 | 2 | 14 |
| 10 | 2 | 8¾ Tare. |
| 74 | 0 | 5¼ Nett Wt. |

The Tare in the laſt Example is to be found by the foregoing Directions, 10 *C.* 2 *qrs.* 8*lb.*¾, which ſubtracted as in the Work, leaves 74 *C.* 0 *qrs.* 5*lb*¼ for the Nett Wt.

But the foregoing Example may be ſooner done by *Practice*, thus:

| | *C.* | *qrs.* | *lb.* |
|---|---|---|---|
| 14*lb.* is ⅛ of *C.* 8) | 84 | 2 | 14 Groſs. |
| Sub. | 10 | 2 | 8¾ Tare. |
| | 74 | 0 | 5¼ Nett. |

In this Method the Groſs Weight is divided by 8, becauſe 14*lb.* is one Eighth of 112*lb.* and the Remainder is reduced into the next inferior Name, and ſtill divided by 8, to the End, and then deducted as above, and the Nett Weight is the ſame as by the other Way. And ſo may any Tare *per Cwt.* be found, if the Tare be an even Part of 112*lb.* as 14 is one Eighth, and 7*lb.* is the Half of that, *&c.* that is, if the Tare be at 7*lb. per C.* find it for 14*lb.* as before, and then take the Half of that for 7*lb. per C.* Tare, the like for 8*lb. per C.* Tare; take one Seventh for 16*lb.* and then the Half of that for 8*lb. per C.* Tare.

## *Of TRETT.*

What *Trett* is when allowed, and how found, hath been ſaid already; now I ſhall give an Example for Explanation, as follows:

Bought ſix Hogſheads of Tobacco, containing Groſs and Tare as follows, *viz.*

| *No.* | | *C.* | *qrs.* | *lb.* | | *lb.* |
|---|---|---|---|---|---|---|
| 1 | qt. | 4 | 1 | 20 | *Tare* | 80 |
| 2 | | 5 | 2 | 19 | | 100 |
| 3 | | 6 | 3 | 18 | | 102 |
| 4 | | 7 | 3 | 12 | | 104 |
| 5 | | 8 | 2 | 13 | | 106 |
| 6 | | 9 | 1 | 14 | | 110 |
| | | 42 | 3 | 12 | | 602 |

| | |
|---|---|
| Suttle | |
| 26)4198(161*lb.* Trett | |
| 26 | 42 |
| | 42 |
| 159 | 4296 |
| 156 | |
| | 4800 Pounds Groſs. |
| 38 | Subtract 602 Pounds Tare. |
| 26 | |
| | 4198 Pounds Suttle. |
| 12 | Deduct 161 $\frac{6}{13}$ Pounds Trett. |
| | 4036 $\frac{7}{13}$ Pounds Nett. |

There are ſome few other Rules, ſuch as Barter, or exchanging Goods for Goods; alſo Exchange for Coin, Profit, Loſs, &c. but all of them being done either by the Rule of Three, or by the Rules of Practice, it is therefore here unneceſſary to enlarge upon them.

## *Of* FRACTIONS, *Vulgar and Decimal.*

WHAT *Fractions* are, hath already been hinted in the Rule of *Diviſion*, from whence they ariſe; for the Remainder is a Part of a Dividend remaining undivided; as admit 54*l.* is divided into 12 equal Parts, the Quotient is 4, and the Remainder 6: So that here 6 remains, as yet undivided by 12, and is therefore 6 Parts in 12, or 6 Twelfths, equal to a half; for 6 is the $\frac{1}{2}$ of 12; and the Remainders are uſually ſet down in this Form $\frac{6}{12}$

and when ſo, the Expreſſion is called a Fraction; whoſe Parts are underſtood by theſe Names, *viz.*

6 *Numerator.*
—
12 *Denominator.*

The *Numerator* is above the ſhort Line, and ſheweth the Number of Parts ſignified by the Fraction; and the *Denominator* ſtands under the Line, and declares the Number of Parts into which the Integer or whole Number is divided; as above 54*l.* is divided into 12 parts, and the Quotient ſays there are 4 times 12 contained in 54, and 6 remains, which is 6 Twelfths of a Pound, or 10*s.* as aboveſaid.

Fractions are thus ſet down and read, *viz.* $\frac{1}{4}$, one Fourth; $\frac{1}{2}$, one Half; $\frac{1}{3}$, one Third; $\frac{1}{5}$, one Fifth; $\frac{1}{6}$, one Sixth; $\frac{2}{3}$, two thirds; $\frac{2}{4}$, two Fourths; $\frac{2}{6}$, two Sixths; $\frac{5}{7}$, five Sevenths, *&c.*

Fractions are either proper or improper: A proper Fraction hath its Numerator leſs than the Denominator, as $\frac{5}{8}$, five Eighths; $\frac{24}{56}$, Twenty-four Fifty-ſixths, *&c.*

An improper Fraction hath its Numerator greater than the Denominator; $\frac{2}{3}$, ſeven Thirds; $\frac{48}{15}$, Forty-eight Fifteenths, *&c.*

Again, Fractions are either Simple or Compound; Simple, when a Part of an Integer or Thing hath but one Numerator, and one Denominator; as $\frac{3}{4}$ of a Pound Sterling, $\frac{1}{2}$ of *C.* Weight, $\frac{2}{3}$ of a Tun, $\frac{5}{6}$ of a Gallon, *&c.* Compound is a Fraction of a Fraction, as the $\frac{1}{2}$ of a $\frac{1}{4}$ of a Pound Sterling, which is equal to Half a Crown; or when one is divided into any Number of Parts, and thoſe Parts again ſubdivided into Parts, *&c.*

Fractions are of two Kinds, *viz. Vulgar* and *Decimal. Vulgar* Fractions are as declared before. *Decimal* Fractions are artificially expreſſed, by ſetting down the Numerators, only, the Denominators being underſtood; and are always an Unit, with as many Cyphers annexed as there are Places in the Numerator; and therefore may be either 10, or ſome Power of 10, as 100, 1000, 10,000, or 100,000, *&c.*

*Decimal* Fractions appear as whole Numbers, (and are in general ſo wrought) but are diſtinguiſhed from them by a Point or Comma prefixed thus; ,5 is read five Tenths; ,32 thirty-two Hundredths; and ,256 two hundred 56 Thouſandths; but of *Decimal* Fractions, and their Uſe, hereafter.

*Reduction of Vulgar Fractions,* is to fit or prepare them for *Addition, Subtraction,* &c.

### 1. *To reduce a mixed Number to an improper Fraction.*

*Rule.*

Multiply the Integer by the Denominator, and take i the Numerator.

*Example.*

Reduce 12 Gallons ¾ to an improper Fraction, thus:

$$\begin{array}{r} 4 \\ \hline 51 \\ \hline \end{array}\ \text{New Numerator.}$$

*Anſwer* $\frac{51}{4}$, or 51 Quarts.

### 2. *To reduce an improper Fraction to a whole or mixt Number.*

*Rule.* Divide the Numerator by the Denominator.

*Example.*

Reduce the laſt Example to a whole or mixt Number, *viz.*

$$\frac{51}{4} \qquad \begin{array}{r} 4)\ 51 \\ \hline 12 \\ \hline 3 \end{array}$$

3 Remainder: equal to ¾.

Here 12 Gallons is the whole Number, ¾ the Fraction; the ſame with three Quarts.

### 3. *To reduce Fractions to a common Denominator.*

*Rule.*

Multiply the Numerator of each Fraction into all the Denominators except its own, and the Product will be a Numerator to that Fraction; and then do ſo by the next, &c.

*Example.*

Reduce ⅔, ¾, and ⅚ of any Integer, to a common Denominator; ſay twice 4 is 8, and 6 times 8 is 48, for a new Numerator to ⅔; then ſay 3 times 3 is 9, and 6 times 9 is 54, for a new Numerator to ¾; laſtly, ſay, 5 times 4 is 20, and 3 times 20 is 60, the Numerator to ⅚: Then to find the common Denominator, ſay 3 times 4 is 12, and 6 times 12 is 72, the common Denominator; ſo that $\frac{48}{72}$ is equal to ⅔, $\frac{54}{72}$ to ¾, and $\frac{60}{72}$ to ⅚. Which may be thus proved:

⅔ of

| | | | | |
|---|---|---|---|---|
| $\frac{2}{3}$ of a Pound is | 13 | 4 | 48 | $72)\ 162\ (2\frac{18}{72}$ or $2\frac{1}{4}$ |
| $\frac{3}{4}$ ditto | 15 | 0 | 54 | 144 |
| $\frac{5}{6}$ ditto | 16 | 8 | 60 | 18 |
| 2*l.* 5*s*. or | 45 | 0 | $\frac{162}{72}$ | Common Denominator. |

Here the ſeveral Numerators are added together, and they make 162; which placed over the common Denominator 72, make the improper Fraction $\frac{162}{72}$; and its Value is found as before directed, *in the Rule for reducing an improper Fraction to a whole or mixt Number*; as may be ſeen in the foregoing Page.

### 4. *To reduce a Fraction into its loweſt Terms.*

#### *Rule.*

If they are even Numbers, take half of the Numerator and Denominator, as long as you can; and then divide them by any digit Number *(i. e.* 3, 4, 5, 6, *&c.)* that will leave no Remainder in either.

#### *Example.*

Reduce $\frac{56}{84}$ into its loweſt Terms; ſay, the half of 56 is 28, and the $\frac{1}{2}$ of 84 is 42; and then the half of 28 is 14, and the $\frac{1}{2}$ of 42 is 21: So the Fraction $\frac{56}{84}$ is reduced to $\frac{14}{21}$. And ſince they cannot be halved any longer, for though you can halve 14, yet you cannot 21, without Remainder; try therefore to divide them by ſome other digit Number; and you will find, that 7 will divide both Numerator and Denominator without any Remainder; then ſay the 7's in 14 twice, and the 7's in 21, three times: So the Fraction $\frac{56}{84}$ reduced into its loweſt Terms, will be $\frac{2}{3}$; which is of the ſame Value as $\frac{56}{84}$. The Work is done in this Form.

$$\frac{\overset{2}{56}}{84}\ \Big|\ \frac{\overset{2}{28}}{42}\ \Big|\ \frac{\overset{7}{14}}{21}\ \Big|\ \frac{2}{3}$$

And the Proof that $\frac{2}{3}$ is of the ſame Value with $\frac{56}{84}$ will appear by multiplying any Integer by the Numerator of each Fraction, and dividing by the Denominator of each Fraction.

*Example.*

Let the Integer be 1*l.* Sterling, or 20*s.*

| The Fraction $\frac{2}{3}$ | The Fraction $\frac{56}{84}$ | |
|---|---|---|
| *s.* | *s.* | |
| 20 | 20 | |
| 2 | 56 | |
| 3)40 | 84)1120(13*s.* | |
| 13—4*d.* | 84 | |
| | 280 | 13*s.* 4*d.* |
| | 252 | |
| | 28 | |
| | 12 | |
| | 336(4*d.* | |
| | 336 | |
| | (0) | |

Here it is manifeſt, that by working by a Fraction in its loweſt Terms, much Time and Figures are ſaved. In one Operation, 20 the Integer is multiplied by 2, and the Product 40 divided by 3, and there remains 1, or $\frac{1}{3}$ of a Shilling, or a Groat, as in the other Work.

There are other Methods of reducing a Fraction into its loweſt Terms; but none ſo ready as the foregoing, where it can be uſed.

### 5. *To reduce a Compound Fraction into a ſimple one of the ſame Value.*

*Rule.* Multiply the Numerators together for a new Numerator, and the Denominators together for a new Donominator.

*Example.*

Reduce $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{5}{6}$ of a Pound Sterling into a ſimple Fraction. Say twice 3 is 6, and 5 Times 6 is 30, the Numerator; then three Times 4 is 12, and 6 Times 12 is 72, the Denominator: So $\frac{30}{72}$ of a Pound is equivalent to $\frac{1}{3}$ of $\frac{3}{4}$ of $\frac{5}{6}$ of a *l.* Thus proved, $\frac{5}{6}$ of a *l.* 16*s.* 8*d.* and $\frac{3}{4}$ of 16*s.* 8*d.* is 12*s.* 6*d.* and $\frac{2}{3}$ of 12*s.* 6*d.* is 8*s.* 4*d.* the Anſwer. And multiplying 20*s.* by 30, and dividing by 72, gives the ſame Anſwer, as in the following Work is plain.

20

20
30

72)600(8*s.*
576

24 Remains
12 Multiply

72)288(4*d.*
288

(0)

} 8*s.* 4*d.*

6. *To find the Value of any Fraction, whether of Coin, Weight, or Meaſure.*

*Rule.* Multiply the Integer by the Numerator, and divide by the Denominator; and if any Thing remains, multiply it by the Number of Units of the next inferior Denomination.

*Example.*

What is $\frac{10}{72}$ of a Pound, or 20*s.*? The Operation of the foregoing Example of Proof to the Compound Fraction $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{5}{6}$, anſwers this Queſtion, and need not be repeated.

Again, What is $\frac{5}{6}$ of a Tun Weight?

*C.*
20 the Integer.
5 the Numerator.

The Denominator 6) 100

*C.* 16—4 remains.
4 *qrs.* 1 *C.*

6) 16

*qrs.* 2—4 remains.
28 *lb.* 1 *qr.*

6) 112

*Anſwer,*
16 *C.* 2 *qrs.* 18 $\frac{4}{6}$ *lb.*

*lb.* 18—$\frac{4}{6}$

G 5

Here the Integer 20 *C.* is multiplied by the Numerator 5 and the Product 100 divided by the Denominator 6, and the Remainder 4 is multiplied by the Parts of the next inferior Denomination, *&c.* and the Anſwer is 16 *C.* 2 *qrs.* 18 *lb.* $\frac{4}{6}$, or $\frac{2}{3}$ of a Pound Weight, as in the Work.

### *Addition of Vulgar Fractions.*

IF the Fractions to be added have a common Denominator, add the Numerators together for a Numerator, and place it over the common Denominator.

*Example.*

Add $\frac{2}{5}$ $\frac{3}{5}$, and $\frac{4}{5}$ of a Pound Sterling together. Say 2 and 3 is 5, and 4 is 9, the Numerator; which place over 5 the common Denominator, thus $\frac{9}{5}$, and this improper Fraction $\frac{9}{5}$, is in Value 36*s.* for 9 Times 4*s.* (the 5th of a Pound) is 36*s.* for if the Number 9 be divided by the Denominator 5, I ſay the 5's in 9*l.* once, and 4 remains, which is $\frac{4}{5}$ of a Pound, or 16*s.*

$$\begin{array}{r} 5)9 \\ \hline 1\frac{4}{5} \end{array}$$

But if the Fractions to be added have unequal Denominators, then they muſt be reduced to a common Denominator, by the Rule before ſhewn, before Addition can be made; and then proceed as above.

2. When mixed Numbers are to be added, work with the fractional Parts as before, and carry the fractional Value to the whole Numbers.

*Example.*

Add 25*l.* $\frac{3}{4}$ to 12 $\frac{1}{4}$, thus

$$\begin{array}{r} 25\frac{3}{4} \\ 12\frac{1}{4} \\ \hline l.\ 38\ \textit{Anſwer.} \end{array}$$

Here 1 and 3, the Numerators, make 4; and $\frac{4}{4}$ is 1; and 2 is 3, and 5 makes 8; and 1 and 2 is 3, and the Anſwer is 38.

Or they may be reduced to improper Fractions thus:

$$\begin{array}{ccc} 25\frac{3}{4} & 12\frac{1}{4} & 103 \\ 4 & 4 & 49 \\ \hline 103 & 49 & 4)\ 152 \\ \hline 4 & 4 & 38 \text{ Pounds.} \end{array}$$

Here the Numerators are added, and their Total is 152; which divided by 4, the common Denominator, quotes 38 Pounds, the ſame Anſwer as above.

3. When compound Fractions are to be added to ſimple ones, reduce the compound Fraction to a ſimple one, as before directed; and then proceed as above.

*Example.*

Add $\frac{2}{8}$ and $\frac{3}{8}$ to $\frac{1}{2}$ of $\frac{2}{4}$ of a Pound; thus once 2 is 2, and twice 4 is 8, therefore $\frac{2}{8}$ is equal to the compound Fraction. Then add, ſaying, 2 and 3 is 5, and 2 is 7, the new Numerator, and $\frac{7}{8}$ equal in Value to 17*s.* 6*d.* will be the Anſwer.

### *Subtraction of Vulgar Fractions.*

IN this Rule the Fractions muſt have a common Denominator, or be reduced to one, before Deduction can be made.

*Example.*

What is the Difference between $\frac{1}{4}$ and $\frac{3}{4}$? Anſwer $\frac{2}{4}$; which may be proved by Addition, for $\frac{1}{4}$ and $\frac{2}{4}$ make $\frac{3}{4}$.

*Note,* The Difference between the Numerators is the Difference of the Fractions.

Again from $\frac{3}{4}$ of a Pound take $\frac{5}{12}$: Here the Fractions are to be reduced to a common Denominator; 36 is the firſt Numerator, and 20 the ſecond Numerator, their Difference is 16; and 48 is the common Denominator: So that $\frac{16}{48}$ or $\frac{1}{3}$, in its loweſt Terms, is the Difference between $\frac{3}{4}$ of a Pound, and $\frac{5}{12}$ of a Pound.

*To ſubtract a compound Fraction from a ſimple one.*

*Rule,* Reduce the compound Fraction to a ſimple one, and then work as before.

*Example.*

From $\frac{13}{14}$ take $\frac{2}{3}$ of $\frac{8}{9}$, ſay twice 8 is 16, and 3 Times 9 is 27, therefore $\frac{16}{27}$, is equal to a compound Fraction. The $\frac{13}{14}$ and $\frac{16}{27}$ muſt be reduced to a common Denominator thus: 13 Times 27 is 351, the firſt Numerator; 16 Times 14 is 224, the ſecond Numerator; and 14 Times 27 is 378 the common Denominator. Then ſubtract 224 the ſecond Numerator, from 351 the firſt Numerator, and the Remainder is 127, which place over 378, the common Denominator, thus $\frac{127}{378}$ *Anſwer.*

*When a ſimple Fraction is to be deducted from a whole Number.*

*Rule,* Subtract the Numerator of the Fraction from the Denominator, and place the Remainder over the Denominator, and carry 1 to ſubtract from the whole Number, &c.

*Example.*

From 12*l.* take $\frac{5}{8}$ thus: Say 5 (the Numerator) from 8 (the Denominator) and there remains 3, which place over

the

the Denominator 8, thus $\frac{3}{8}$; then 1 from 12 and there remains 11. So the Anſwer is, *l.* 11 $\frac{3}{8}$, or *l.* 11 7 6.

### *Multiplication of Vulgar Fractions.*

*Rule*—MULTIPLY the Numerators into one another for the Numerator of the Product; and then do the ſame by the Denominators, for the Denominator of the Product.

*Example.*

Multiply $\frac{3}{4}$ of a Pound by $\frac{5}{6}$ of ditto: ſay 3 Times 5 is 15, the Numerator; and 4 Times 6 is 24, the Denominator: So the Anſwer is $\frac{15}{24}$, or in the loweſt Term $\frac{5}{8}$.

*You are to note,* That Multiplication in Fractions leſſens the Product though in whole Numbers it augments it; as above $\frac{5}{8}$, or 12*s.* 6*d.* is leſs than $\frac{5}{6}$, or 16*s.* 8*d.* and alſo leſs than the other Fraction $\frac{3}{4}$, or 15*s.* The reaſon of which I have not here room to inſiſt on; but it is given in my *Arithmetic, in Multiplication of Vulgar Fractions*; to which Book I refer the Reader for that, and ſundry enlargements in the ſeveral Rules of the Science of Arithmetic.

### 2. *To multiply a whole Number by a Fraction.*

*Rule,* Multiply the Integer by the Numerator of the Fraction, and place the Product over the Denominator.

*Example.*

Multiply 56*l.* by $\frac{3}{4}$

$$\begin{array}{c} 56 \\ 3 \\ \hline \left.\begin{array}{c} 168 \\ \hline 4 \end{array}\right\} \textit{Facit.} \end{array}$$

This improper Fraction $\frac{168}{4}$ reduced according to rule, makes but 42*l.* which is leſs than 56: and confirms what was before aſſerted, *viz.* that Multiplication of Fractions leſſens the Product, &*c.*

### *To multiply a Simple by a Compound Fraction.*

*Rule,* Reduce the Compound Fraction to a ſimple one, as before taught, and work as above.

*Example.*

Multiply $\frac{6}{8}$ of a Pound, by $\frac{2}{3}$ of $\frac{3}{4}$ of a Pound: ſay 6 Times 6 is 36, and 8 Times 12 is 96. So that the Anſwer is $\frac{36}{96}$, or $\frac{3}{8}$ in its loweſt Terms; equal to 7*s.* 6*d.*

### *Diviſion of Vulgar Fractions.*

*Rule*—MULTIPLY the Numerator of the Diviſor into the Denominator of the Dividend, and the Product is the Denominator of the Quotient; and then multiply the Denominator of the Diviſor into the Numerator of the Dividend, and the Product will be the Numerator of the Quotient.

*Example.*

Divide $\frac{15}{16}$ by $\frac{2}{3})\frac{15}{16}(\frac{45}{32}$ Quotient.

Here 16, multiplied by 2, gives 32; and 15 by 3, gives 45: So that the Quotient is $\frac{45}{32}$ equal to $\frac{14}{32}$, as in the work.

Again, ſuppoſe $\frac{24}{36}$ was divided by $\frac{2}{3}$, the Quotient will be $\frac{72}{72}$, equal to 1 Integer, or whole thing. And ſo for any other Example.

### *Reduction of Decimal Fractions.*

WHAT a *Decimal Fraction* is, hath been already ſhewn. The next ſtep is, how to reduce a Vulgar Fraction into a Decimal: which is no more than to annex Cyphers at diſcretion (that is 2, 3, or 4, *&c.*) to the Numerator, and then divide it by the Denominator.

*Example* 1.

Reduce $\frac{3}{4}$ of a Pound Sterling to a Decimal.

$$\left.\begin{array}{r} 4)300 \\ \hline 75 \end{array}\right\}$$

that is, 75 hundredths, equal to 3 qrs. of any thing, whether money, weight, meaſure, *&c.* as being $\frac{3}{4}$ of 100; and ſo 25 hundredths is, in Decimals, the Quarter of any thing, as being the $\frac{1}{4}$ of a 100; and five tenths expreſſes the half of any thing, as being the $\frac{1}{2}$ of 10.

In Reduction of Decimals ſometimes it happens that a cypher or cyphers, muſt be placed on the left hand of the Decimal, to ſupply the defect of the want of places in the Quotient of Diviſion. In this caſe always remember, that ſo many cyphers as you annex to the Denominator of the Vulgar Fraction, ſo many places you muſt point off in the Quotient towards the left hand; but if there be not ſo many places to point off, then you muſt ſupply the defect by placing a cypher or cyphers to the left of the Decimal.

*Example.*

Reduce 9*d.* or $\frac{9}{240}$ to the Decimal of a Pound Sterling, thus:

```
24) 0,9000,0(,0375
    72..
    ——
    180
    168
    ——
     120
     120
     ——
     (0)
```

Here are but three places in the Quotient, *viz.* 375; and therefore I cannot point off 4 for the four cyphers annexed to 9; wherefore I prefix 0 to the left of the Quotient 375, thus, 0375, and then it is 375 ten thouſand parts of an Integer.

The more cyphers you annex, the nearer you bring your Decimal to the truth: but in moſt caſes, four cyphers annexed are ſufficient. But when you are to reduce $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$ (as above) of an Integer to a Decimal, or any number of ſhillings to a Decimal of a Pound, two cyphers are ſufficient. One Example more.

*Example* 3.

Reduce 3 farthings to the Decimal of a Pound, that is the Vulgar Fractions $\frac{3}{960}$ farthings in a pound.

96 | 0)3,0000 | 0(,003125. The work being performed according to the Diviſion, with two cyphers prefixed, quotes ,003125, or by 3125 ten hundred thouſandth parts of a pound. By the ſame method, the Vulgar Fractions of Weight, Meaſure, &c. are reduced to Decimals.

*Example* 4.

How is 12 pounds weight expreſſed in the Decimal of 1 *C.* weight *Avoirdupois*, or 112*lb*? The Vulgar Fraction is $\frac{12}{112}$, and the Decimal, ,1071 found as before, thus:

```
112)12,0000(,1071
    112
    —
      80, &c.
```

The Remainder, 48, is not worth notice, being leſs than the 100000 part of a Unit, or 1.

*Example* 5.

How is 73 days brought to the Decimal of a year? Vulgarly thus expreſſed $\frac{73}{365}$.

```
365)730(,2 Anſ. 2 tenths.        Thus proved    36 5
    730                                         36 5
    —                                           ——
    (0)                                         73
                                                ——
```

Here 365, the days in a year, are divided by 10, twice, and the Quotients added together, and they make 73 days.

Va-

## *Valuation of Decimals.*

TO find the value of a Decimal Fraction whether of corn, weight, meaſure, &c.

*Rule*, Multiply the Decimal given, by the Units contained in the next inferior Denomination, and point off as many places from the right hand as you have in your Decimal, ſo thoſe figures towards the left of the point are Integers, or whole numbers; and thoſe on the other ſide, towards the right hand, are parts of 1, or Unity; that is, ſo many tenths, hundredths, thouſands, or ten thouſandths, of one of thoſe Integers, whether a pound, a ſhilling, or a penny, &c. of a Ton, a Hundred, a Quarter, or a Pound Weight, &c. And ſo many of any other Integer, of what quality or kind ſoever.

*Examples.*

,476 Parts of a Pound Sterling.
20 Shilling a Pound.

9,520
12 Pence one Shilling.

6,240
4 Farthings 1 Penny.

,960 Parts, or almoſt ¾ of a 1d.

*Anſwer*
9*s.* 6*d.* 960
Parts, or ¾
of 1*d.*

,476 Parts of a Ton Wt.
20 *C.* 1 Ton.

9,520
4 *qrs.* 1 *C.*

2,080
28 *lb.* 1 *qr.* of a *C.*

2,240

*Anſwer*
9 *C.* 2 *qrs.* 2 *lb.* 240 Parts

In the Example of Money, I multiply the Fraction by 20, and point off 520 for the three places in the Decimal, &c. and the Anſwer is 9*s.* 6*d.* ¾ nearly.

In the Example of Weight, I proceed as in that of money, (the Fraction being the ſame) but with different reſpect to the inferior denominations, and the Anſwer is 9 *C.* 2 *qrs.* 2 *lb.* $\frac{240}{1000}$ of a Pound wt.

To find the value of a Decimal in money in a briefer method, *viz.*

*Rule,* Always account the double of the firſt figure (to the left hand) for ſhillings; and if the next to it is 5, reckon one ſhilling more; and whatever is above 5, call every one ten; and the next figure ſo many ones as it contains; which tens and ones call farthings; and for every 24, abate one. As admit the laſt example of money, *viz.* 476; the double of 4 is 8, and there being one 5 in 7, (the next figure) I reckon 1*s.* more, which makes 9*s.* and there being 2 (in the 7) above 5, they are to be accounted two tens, or 20; which with the next figure 6 being ſo many ones, making 26 farthings; and abating 1 for 24, they give 6*d.* and a farthing more.

### *Addition of Decimals*

IS the ſame in practice as in whole numbers; only in ſetting down, care muſt be taken that the Decimal parts ſtand reſpectively under like parts; that is, Primes under Primes, Seconds under Seconds, Thirds under Thirds, &c. and the Integers ſtand as in whole numbers.

*Example.*

| Inte-gers. | Primes | Seconds | Thiirds | Parts | Primes | Seconds | Thirds | Fourths | Fifths |
|---|---|---|---|---|---|---|---|---|---|
| 246 | ,4 | 2 | 6 | ,4796 | ,4 | 7 | 9 | 6 | 2 |
| 74 | ,4 | 2 | | ,42 | ,0 | 6 | 4 | 2 | |
| 9 | ,0 | 6 | | ,076 | ,0 | 0 | 6 | | |
| 65 | ,7 | 9 | 4 | ,0004 | ,7 | | | | |
| 42 | ,0 | 0 | 5 | ,5 | ,9 | | | | |
| 437 | ,7 | 0 | 5 | 1 ,4760 | 2 ,1 | 4 | 9 | 8 | 2 |

Note, *There muſt be as many places pointed off, as there are in that number which has moſt Decimal places.*

The caſting up of the foregoing Examples is the ſame with Addition of one Denomination, in whole Numbers. The total of the firſt (ſuppoſing them pounds ſterling) is 437*l.* and ,705 parts. The ſecond is 1*l.* and ,4760 parts. And the third is 2*l.* and ,14982 parts

### *Subtraction of Decimals.*

THE numbers muſt be placed as before in *Addition*, and then proceed as in *Subtraction of numbers of one Denomination.*

| *l. pts.* | *l. pts.* | *l. pts.* |
|---|---|---|
| 46,51 | 140,42 | 4762,0 |
| 9,24 | 91,7462 | 0,472 |
| 37,27 | 48,6738 | 4761,528 |

### *Multiplication of Decimals.*

HERE the placing the numbers, and the operation is the very ſame as in the whole numbers; remember only to point off, towards the right hand, ſo many places for Decimals, as you have Decimal places in both *Multiplicand* and *Multiplier*.

### *Examples.*

| (1) | (2) | (3) |
|---|---|---|
| 24,6 | 4602 | ,2796 |
| 2,5 | ,075 | 26 |
| 1230 | 23010 | 16776 |
| 492 | 32214 | 5592 |
| 61,50 | 345,150 | 7,2696 |

| (4) | (5) | (6) |
|---|---|---|
| ,07214 | ,083 | 4,25 |
| ,006 | ,16 | 1,09 |
| ,00043284 | 498 | 3825 |
|  | 083 | 4250 |
|  | ,01328 | 4,6325 |

*Note*, That when there are not a competent number of figures, or places to point off, ſuch defect is ſupplied with cyphers to the left hand; as in the 4th and 5th Examples according to what was before hinted in reducing a Vulgar Fraction to a Decimal.

*Divi-*

## *Diviſion of Decimals*

IS the ſame in operation as in whole numbers: the only difficulty is to know how many Decimal Places to point off, towards the left hand of the Quotient: to which end, remember this rule; obſerve how many Decimal places there are, both in the Diviſor and in the Dividend, and find the difference; and whatſoever it is, ſo many places muſt be pointed off to the right hand of the Quotient.

### *Examples.*

Divide 12,345670 by 6,789)12,345670(1,818
6,789...
55566
54312
12547
6789
57580
54312
3268

In this Example, the Dividend hath three Decimal places more than the Diviſor, wherefore I point off three places to the right hand of the Quotient, *viz.* 818; ſo the Quotient is 1 Integer, and ,818 parts.

Divide 3,46000 by 1,23)3,46000(2,813
246...
1000
984
160
123
370
369
(1)

Here the difference between the Decimal places in the Diviſor and Dividend is three places; as in the foregoing example; therefore 813 is pointed off for the Decimal Fraction; and the Quotient is 3 Integers, and ,813 Thouſandths of an Integer.

Thus much for Fractions Vulgar and Decimal; wherein I have been as conciſe as poſſible, and worked with as much plainneſs as I could invent.

*BOOK-*

## *BOOK KEEPING.*

THE next qualification to fit a man for buſineſs, after *Arithmetic*, is the art of *Book Keeping*, or *Merchants' Accompts*, after the *Italian* manner, by way of Double entry. It is not without good reaſon, that moſt people of buſineſs and ingenuity are deſirous to be maſters of this art; for if we conſider the ſatisfaction that naturally ariſeth from an accompt well kept; the pleaſure that accrues to a perſon by ſeeing what he gains, by ſuch ſpecies of goods he deals in, and his whole profit by a year's trade; and thereby alſo, to know the true ſtate of his affairs and circumſtances, ſo that he may, according to diſcretion, retrench or enlarge his expences, &c. as he ſhall think fit.

The art of *Book Keeping*, or *Merchants' Accompts*, is talked of by many, but truly underſtood but by very few; for every petty School-maſter in any bye-corner, will be ſure to have *Merchants' Accompts* expreſſed on his ſign, as a principal article of his ability in teaching; though ſtrictly ſpeaking, for want of the practical part, he knows hardly any thing of the matter, and is conſequently incapable of teaching it.

## Inſtructions, Notes, Rules, and Directions, for the right ordering and keeping *Merchants' Accompts*, by the excellent order of Charge and Diſcharge, commonly called *Debtor* and *Creditor*.

### *Of the Books in Uſe.*

THE books of principal Uſe, are the *WaſteBook*, (by ſome called the *Memorial*) *Journal* and *Ledger*.

### *Waſte Book.*

IN this book muſt be daily written whatever occurs in the way of trade; buying, ſelling, receiving, delivering, bargaining, ſhipping, &c. without omiſſion of any one thing either bought or ſold, borrowed &c.

The *Waſte Book* is ruled with one marginal line, and three lines for pounds, ſhillings, and pence, and the day of the month, and year of our Lord, is inſerted in the middle of the page. In this book any one may write, and on occaſion, any thing may be blotted out, if not well entered, or any error be made.

## JOURNAL.

INTO this Book every article is brought out of the *Waſte Book*, but in other terms, in a better ſtile, and in a fairer hand, without any alteration of cyphers or figures; and every parcel, one after another, are promiſcuouſly ſet without intermiſſion, to make the Book, or ſeveral entries of it, of more credit and validity in caſe of any Law diſpute, or any other controverſy that may happen between Merchant and Merchant. In this Book you are to diſtinguiſh the Debtor and Creditor (or in other terms, the *Debts* and *Credits.)* And to this book you muſt have recourſe for the particulars of an account which in the Ledger are entered in one line. In this Book alſo, the day of the month is uſually placed in the middle of the page: it is ruled with double marginal lines, for reference to the Ledger; and with three lines for *l. s. d.* as the Waſte Book.

### *Of the Ledger.*

FROM the *Journal* or *Day Book*, all matters or things are poſted into the Ledger, which by the *Spaniards* is called *El Libro Grande*, as being the biggeſt book, or chief of accounts. The left hand ſide of this book is called the *Debtor*, and the right the *Creditor* ſide; and the *Numbers*, or *Folios* of each ſide muſt be alike, as 45 *Debtor*, and alſo 45 *Creditor*. The day of the month (in this Book) is ſet in a narrow column on the left hand, and the month on the left of that: But where I kept books, the number in the narrow column referred to the Journal page, and the month and day were placed in the broad column, to the right of that; and at the head of each Folio is the name of the place of reſidence, and the year of our Lord; as thus:

*London, Anno*——————————1798.

But the Example of theſe ſeveral books hereafter following, will make the foregoing hints of them much more intelligible. The following is a general rule, upon which moſt of the entries in Book-keeping depend, *viz.*

*All things Received, or the Receivers, are Debtors to the Delivered, or the Deliverer.*

| | *Waſte-Book Entry.* | *l.* | *s.* | *d.* |
|---|---|---|---|---|
| | Bought of *William Wilkins*, of *Norton Falgate*, 120 Yards of white Sarſenet, at 2*s.* 3*d.* per Yard, to pay in two Months - | 13 | 10 | — |
| | *The Journal Entry of the ſame.* | | | |
| 1<br>—<br>2 | Wrought Silk, Debtor to *William Wilkins*, *l.* 13—10 for 120 Yards of white Sarſenet, at 2*s.* 3*d.* *per* Yard to pay in two Months. - - - - - - | 13 | 10 | — |
| | *In this Example, the Wrought Silks are received, and therefore Debtor to* William Wilkins *the Deliverer.* | | | |
| | Again,<br>*Waſte-Book Entry.*<br>*January* 4. | | | |
| | Sold *Henry Harrington* 246lb. nett of Indigo, at 6*s.* 6*d.* *per* lb. to pay in 3 Months. | 79 | 19 | — |
| | *Journal Entry.* | | | |
| 3<br>—<br>4 | *Henry Harrington* Dr. to Indigo, for 246lb. nett, at 6*s.* 6*d.* *per* lb. to pay in 3 Months - - - - - - | 79 | 19 | |
| | Once more,<br>*Waſte-Book Entry.* | | | |
| | Bought of *George Goodinch*, Sen. *viz.*<br>*Cheſh.* Cheeſe 430 C. ½, at 23*s.* 4*d.* *per* C. *l.* 502—5<br>Butter, 50 Firkins, qt. neat 2800lb. at 3*d.* *per* lb. 35—0<br>to pay at 6 Months - - - - | 537 | 05 | — |
| | *Journal Entry.* | | | |
| 5<br>—<br>4<br>5 | Sundry Accounts, Cr. to *George Goodinch*, *l.* 537—05<br>*Cheſhire* Cheeſe, for 430 C. ½, at 23*s.* 4*d.* *per* C. *l.* 502—5<br>Butter, for 50 Firkins, qt. nett 2800lb. at 3*d.* *per* lb. - 35—0<br>to pay in 6 Months. | 537 | 05 | — |

*Waſte Book.*

| | | |
|---|---|---|
| Sold to *James Jenkins*, viz. | | |
| White Sarſenet 50 Yards at 3*s.* *per* Yard - | 7—10 0 | |
| Indigo 50 Pounds, at 7*s.* *per* Pound - - | 17—10—0 | |
| | | 25 |

*Journal Entry of the laſt.*

| | | | |
|---|---|---|---|
| 6 | *James Jenkins* Debtor to ſundry Accounts, *viz.* | | |
| 7 | To white Sarſenet for 50 Yards, at 3*s.* *per* Yard - - - - | £. 7—10—0 | |
| 8 | To Indigo for 50 lb. at 7*s.* *per* lb. - - | 17—10—0 | |
| | | | 25 |

From theſe few Examples of Entry, it may be obſerved, that an experienced Perſon in Accompts, and a good Writer, may keep a *Journal* without a *Waſte-Book*, or a *Waſte-Book* without a *Journal*, ſince they both import one and the ſame Thing, though they differ a little in Words, or expreſſing.

But however, I ſhall give Methods of keeping each, as far as Room will give me Leave.

( 1 )

*The Waſte Book.*

*London*, *January* 1*ſt* 1798.

*An Inventory of all the Money, Goods, and Debts, belonging to me* A. B. *of* London, *Merchant*, viz.

| | | | | | | |
|---|---|---|---|---|---|---|
| In Caſh - - - | 3500 | — | — | | | |
| In Tobacco 4726 lb. at 9*d.* *per* lb. - - - | 177 | 4 | 6 | | | |
| In Broadcloth 6 Pieces, at 50*s.* *per* Piece - - | 15 | — | — | | | |
| Dowlas 1000 Ells, at 2*s.* 4*d.* *per* Ell, - - | 116 | 13 | 4 | | | |
| Canary Wines 9 Pipes, at 30*l.* *per* Pipe - - | 270 | — | — | | | |
| Due to me from *Henry Bland*, *per* Bond - | 60 | — | — | 4138 | 17 | 10 |

(1)

### *Journal.*

### *Inventory, &c.*

| | | | | | l. | s. | d. |
|---|---|---|---|---|---|---|---|
| 1 | Sundry Accts. Dr. to Stock—4138 17 10 *viz.* | | | | | | |
| 1 | Caſh | 3500 | — | — | | | |
| | Tobacco for 4726lb. at 9*d. per* lb. | 177 | 4 | 6 | | | |
| 1 | Broadcloths for 6 Pieces, at 50*s. per* Piece. | 15 | — | — | | | |
| | Dowlas for 1000 Ells, at 2*s.* 4*d per* Ell. | 163 | 13 | 4 | | | |
| 1 | Canary Wines for 9 Pipes at 30*l. per* Pipe | 270 | — | — | | | |
| 3 | *Henry Bland* due on Bond | 60 | — | — | | | |
| | | | | | 4138 | 17 | 10 |

I ſhall make one Page ſerve for Waſte Book and Journal Entries, to ſave room, and alſo to have both Methods of Entry under Eye, to make them more intelligibly uſeful to the Reader, he hereby being not obliged to turn over Leaf to ſee their Difference of Entry.

### *Waſte Book.*

| | *London, January* 1*ſt.*————1798. | | | | l. | s. | d. |
|---|---|---|---|---|---|---|---|
| | Owing to *William Webb*, by Note of Hand - - | 50 | — | — | | | |
| | Ditto to *Roger Ruff*, the Balance of his Account - - - | 16 | 12 | 4 | | | |
| | Ditto to *Henry Hern* due the 4th of *May* next - - | 62 | — | — | | | |
| | | | | | 128 | 12 | 4 |
| | *Journal.* | | | | | | |
| 1 | Stock Debtor to Sundry Accounts, *l.* 128 12 4 *viz.* | | | | | | |
| 3 | To *William Webb* by Note of my Hand - - | 50 | — | — | | | |
| 4 | To *Roger Ruff*, for the Balance of his Account - - | 16 | 12 | 4 | | | |
| 5 | To *Henry Hern*, due the 4th of *May* next. - - - | 62 | — | — | 128 | 12 | 4 |

*Waſte Book.*

| | | | | |
|---|---|---|---|---|
| | *London, Feb. 2d.*——— | | 1798. | |
| | Sold *Thomas Townſhend, viz.* | | *l.* | *s.* |
| | 246 *lb.* of *Virginia* Cut Tobacco, at 14*d. per lb.* | 14 7 — | | |
| | 460 Ells of Dowlas, at 3*s. per* Ell - - - | 69 — — | | |
| | | | 83 | 7 — |
| | *Feb.* 2. | | | |
| | *Journal.* | | | |
| 6<br>— | *Thomas Townſhend,* Debtor to Sundries, *viz.* | | | |
| 1 | To Tobacco, for 246 *lb.* at 14*d. per lb.* - - | 14 7 — | | |
| 2 | To Dowlas, for 460 Ells, at 3*s. per* Ell - - | 69 — — | | |
| | | | 83 | 7 — |
| | *Waſte Book.* | | | |
| | Ditto 24th. | | | |
| | Bought of *Leonard Legg,* four Pipes of Canary, at 28*l.* Pipe - - - - - - | | 112 | — — |
| | To pay in 6 Months. | | | |
| | Ditto 24th | | | |
| | *Journal.* | | | |
| 1<br>—<br>2 | Canary Wines, Debtor to *Leonard Legg* for 4 Pipes, at 28 Pounds *per* Pipe——— | | 112 | — — |
| | To pay in 6 Months. | | | |

The ſhort Lines ruled againſt the Journal Entries are, or may be, termed Poſting Lines, and the Figure on the Top of the Lines denotes the Folio of the Ledger where the Debtor is entered; and the Figure under the Line ſhews the Folio of the Ledger where the Credit is entered; and the other ſmaller Figures againſt the ſundry Debtors, or ſundry Creditors (whether Goods or Perſons) ſhew alſo in what Folios of the Ledger they are poſted.

The Accounts of Perſons and Things are kept in the Ledger, on oppoſite Pages, in which thoſe which in the Journal are ſaid to be Debtors are entered on the Left-hand Page with the Word *To*; and thoſe, to which they are ſaid to be Creditors, are entered on the Right-hand Page, with the word *By.*

For Inſtance, the laſt Journal Entry ſhould be poſted on the Left-hand, or Debtor's Side, of the Account of *Canary* Wines, thus:

1798
*Feb.* 24. *To Leonard Legg*——4 Pipes——112 0 0

And the ſame ſhould be poſted on the Right-hand, or Creditor Side, of the Account of *Leonard Legg*, thus:

1798
*Feb.* 24. By *Canary* Wines to pay in 6 Months 112 0 0

There are ſeveral other Books uſed by Merchants beſides thoſe three before-mentioned; as the *Caſh Book*, which is ruled as the Ledger, and folio'd, likewiſe, wherein all Receipts of Money are entered on the Left-hand Folio, and Payments on the Right; ſpecifying in every Entry the Day of the Month (the Year being ſet on the Top) for what, and for whoſe Account the Money was received, or paid; and the total Debit or Credit on each Side is to be poſted into the Ledger to the Account of Caſh therein, in one Line of either Side, *viz.* to, or by ſundry Accounts, as *per* Caſh-book, Folio, *&c.* which is to be done once a Month, or at Diſcretion, and the Particulars of each Side, Article by Article, are to be poſted into the Ledger to the proper Accounts unto which they belong; with References in the Caſh Book to the ſeveral Folios in the Ledger; and carry the Balance over Leaf into the Caſh Book, by which you may know at any Time what Caſh you have, or ought to have by you.

Another Book, is a Book of Charges of Merchandize, wherein is to be entered the Cuſtom and petty Charges of any Goods ſhipped; as Porterage, Wharfage, Warehouſe-room, *&c.* which once a Month is transferred into the Caſh-book on the Credit Side, making Reference to the Book of Charges of Merchandize; and likewiſe the ſame in the Debtor Side of the ſame Account in the Ledger for the Amount thereof.

The next Book I ſhall name, is the Invoice-book, or Book of Factories. In this Book is to be copied all Invoices of Goods ſhipped, either for Accompts proper or portable; and alſo of Goods received from Abroad, which muſt always be entered on the Left Side, leaving the Right Side blank; and on the Advice of the Diſpoſal

of

of Goods ſent abroad, and alſo on the Sale of Goods received from abroad, enter them on the Blank or Right-ſide; ſo at firſt View may be ſeen how the Accompt ſtands, &c.

The next is a Bill-book, wherein are entered Bills of Exchange accepted, and when they become due; and when paid, they ſhould be made ſo in the Margin.

The next is a Book of Houſhold Expences, for the monthly Charge ſpent in Houſekeeping; likewiſe Apparel, Houſe-rent, Servants Wages, and Pocket Expences; and this may be monthly ſummed up, and carried to the Credit of Caſh.

Beſides the above-mentioned, there muſt be a Book to copy all Letters ſent Abroad, or beyond the Seas; wherein the Name of the Perſon or Perſons to whom the Letter is ſent, muſt be written pretty full, for the readier finding the ſame.

The next, (and what is very neceſſary) a Receipt-book, wherein are given Receipts for Money paid and expreſſed for whoſe Account or Uſe, or for what it is received; to which the receiving Perſon muſt ſet his Name for himſelf; or ſome other, with the Year and Day of the Month on the Top.

*Laſtly*, A Note, or Memorandum-book, to minute down Affairs that occur, for the better Help of Memory; and is of great Uſe, where there is a Multiplicity of Buſineſs.

Having given an Account of the ſeveral Books and their Uſe, the next Thing neceſſary will be, to give ſome few Rules of Aid, to enable the Book-keeper to make proper Entries; and to diſtinguiſh the ſeveral Debtors and Creditors, *viz.*

*Firſt*, For Money received, make Caſh Dr. to the Party that paid it (if for his own Account) and the Party Cr.

*Secondly*, Money paid, make the Receiver Dr. (if for his own Account) and Caſh Cr.

*Thirdly*, Goods bought for ready Money, make the Goods Dr. to Caſh, and Caſh Cr. by the Goods.

*Fourthly*, Goods ſold for ready Money juſt the contrary, *i. e.* Caſh Dr. and Goods Cr.

*Fifthly*, Goods bought for Time; Goods bought are Dr. to the Seller of them; and the Seller Cr. by the Goods.

*Sixthly*, Goods ſold for Time, juſt the contrary, *i. e.* the Party that bought them is Dr. to the Goods, and the Goods Cr. by the Party.

*Seventhly*, Goods bought, Part for ready Money, and the reſt for Time; Firſt, make the Goods Dr. to the Party for the Whole; Secondly, make the Party Dr. to Caſh for the Money paid him in Part of thoſe Goods.

*Eighthly*, Goods ſold Part for ready Money, and the reſt for Time: Firſt, make the Party Dr. to the Goods for the Whole. Secondly, Caſh Dr. to the Party received of him in Part of thoſe Goods.——Or either of theſe two laſt Rules may be made Dr. to Sundries; as Goods bought, Dr. to the ſelling Man for ſo much as is left unpaid, and to Caſh for ſo much paid in ready Money: And ſo on the contrary for Goods ſold.

*Ninthly*, When you pay Money before it is due, and are to have Diſcount allowed you, make the Perſon Debtor to Caſh for ſo much as you pay him, and to Profit and Loſs for the Diſcount; or make the receiving Man Dr. to Sundries as before.

*Profit and Loſs is Dr.*

To Caſh for what Money you pay and have nothing for it, as Diſcount of Money you receive before due, and for Abatement by Compoſition, Houſhold Expences, &c.

*Per Contra Cr.*

By Caſh for all you receive, and deliver nothing for it, as Diſcount for prompt Payment, any Legacy left you, Money received with an Apprentice, and by the Profit of every particular Commodity you deal in, by Ships in Company, by Voyages, &c.

### *To balance or clear an Account when full written.*

FIRST, if the Dr. Side be more than the Credit, make the old Account Cr. by the New; and if the contrary, make the new Account Dr. to the Old. But if the Dr. Side be leſs than the Credit, then make the old Account Dr. to the New, and the new Account Cr. by the Old, for ſuch a Reſt or Sum as you ſhall find in the Account.

2. An Account of Company, wherein you have placed more received of another than his Stock; then add as much on the Debit Side as you find on the Credit Side; to the End that in the new Account, you may have ſo much Debit as you put in, and ſo much Credit as you have received.

3. In Accounts of Merchandize, you muſt enter the Gain, or Loſs, before you make the old Account Cr. by

the New, and the New Dr. to the old, for the Remainder of the Goods unſold.

4. In the Foreign Accompts, which you are to keep with a double Column for the Dollars, Crowns, or other Foreign Coins, as well as their Value in *l. s. d.* which have been received or paid, by Bills of Exchange for Goods ſold by Factors or Correſpondents, or bought by them for the Accompts before; here you muſt firſt balance the ſaid inward Column of Dollars, Crowns, *&c.*

### *To remove an Accompt full written to another Folio.*

Sum or add up the Dr. and Cr. Sides, and ſee the Difference, which place to its oppoſite: As admit the Cr. Side exceeds the Dr. then you are to write the Line in the old Accompt to balance on the Dr. Side, to anſwer the Line on the Cr. Side of the New Accompt.

### *How to balance at the Year's End, and thereby to know the State of your Affairs and Circumſtances.*

YOU muſt make an Accompt of Balance on the next void Leaf or Folio of your Ledger to your other Accompts; but after ſo done, do not venture to draw out the Accompt of Balance in the ſaid Folio, 'till you have made it exact on a Sheet of Paper, ruled and titled for that Purpoſe, becauſe of Miſtakes or Errors that may occur or happen in the Courſe of balancing your Ledger; which are to be rectified, and will cauſe Eraſements or Alterations in that Accompt, which ought to be very fair and exact; and after you have made it to bear in the ſaid Sheet, copy fair the ſaid Account of Balance in the Ledger.

The Rules for balancing are theſe, *viz.*

*1ſt.* Even your Account of Caſh, and bear the Nett Reſt to balance Dr.

*2dly.* Caſt up all your Goods bought, and thoſe ſold of what Kind ſoever, in each Account of Goods; and ſee whether all Goods bought, be ſold or not; and if any remain unſold, value them as they coſt you, or according to the preſent Market Price, ready Money; and bear the Nett Reſt to balance Dr.

*3dly.* See what your Goods or Wares ſeverally coſt, and alſo how much they were ſold for, and bear the Nett Gain or Loſs to the Accompt of Profit and Loſs.

*4thly.* Even all the perſonal Accompts with your Drs. and your Crs. in order as they lie, and bear the Nett Reſt of them ſeverally to Balance.

*5thly*. Even your Voyages, your Factors Accompts, wherein is either Gain or Loſs, and bear the Nett Gain or Loſs to the Accompt of Profit and Loſs, and the Goods unſold to Balance.

*6thly*. Even the Accompt of Profit and Loſs, and bear the Nett Reſt to Stock or Capital, as an Advance to your Stock or Capital.

*7thly*. Even your Stock, and bear the Nett Reſt to Balance Cr.

Then caſt up the Dr. and Cr. Sides of your Balance; and if they come out both alike, then are your Accompts well kept; otherwiſe you muſt find out your Error by pricking over your Books again, to ſee whether you have entered every Dr. and Cr. in the Ledger as you ought.

Note, *By pricking over the Book is meant, an examining every Article of the Journal, againſt the Ledger, and marking it thus, : or thus* † ; *and upon the ſecond Examination thus* ‡ ; *and upon a third Examination thus* § ; *or any other Mark*.

Note alſo, *In all Accompts of Goods, you muſt keep a Column in the Middle of the Leaf, of each Side, for Number, Weight, or Meaſure*.

Though all that hath been ſaid in relation to Book keeping, and the ſeveral Rules thereunto belonging, may ſeem a little abſtruſe to the altogether Unlearned therein, yet there is no ſuch mighty Difficulty to inſtruct them as they may imagine: For theſe following Hints may render what hath been already ſaid intelligible to an ordinary Capacity.

*1ſt*. Stick cloſe to the Text, or general Rules beforementioned, *viz*. That all Things received, or, the Receiver, are Debtor to all Things delivered, or the Deliverer; for this Rule holds good in all Caſes.

*2d*. When the Dr. (whether Perſon or Goods) is known, the Cr. is eaſily underſtood without mentioning it: for if *A* be Dr. to *B*. then *B*. is Cr. by *A* for what Sum ſoever it be: Alſo, if Goods be Dr. to C. then C. is Cr. by thoſe goods for the Sum they amount to.——This I mention, becauſe that moſt Authors (if not all) that I have met with on the Subject of Book-keeping, ſpend a great many Words, which I think (begging their Pardon if I err) might be ſaved, in declaring the Creditor, as well as ſhewing the Debtor, when it may be underſtood, as aforeſaid.

3*dly.* This Art of *Italian* Book-keeping, is called *Book-keeping by Double-Entry*, becauſe there muſt be two Entries; the firſt being a charging of a Perſon, Money, or Goods, and the ſecond a diſcharging of a Perſon, Money, or Goods.

4*thly.* *ſtrictly note*, That if the firſt Entry be on the Dr. or Left-hand Side of your Ledger, the next or ſecond Entry muſt always be made on the Right or Credit Side of your Ledger; for when one Perſon or Thing is charged, then always another Perſon or Thing is diſcharged for the ſaid Sum, let it be what it will.

And ſo it is in balancing or evening an Accompt, and carrying it to another Folio; for if the old Accompt be evened by the Balance on the Credit Side, then the new Accompt muſt be debited or charged on the Debit-ſide for the Sum that balanced the old Accompt.

Much more might be ſaid on this *Art of Book-keeping*, if I had Room; but I have plainly ſpoken to the principal Fundamentals thereof, which I hope may be ſufficient for the Inſtruction and Improvement of any intelligent Reader.

The next Matter I ſhall go upon is, to ſhew, or give Examples of various Kinds of Receipts, and Promiſſory Notes; alſo Bills of Parcels in different Trades: likewiſe Bills of Book-debts, Bills of Exchange, with remarks on them; and ſome other Precedents of Writings in Trade and Mercantile Affairs.

*And firſt of Receipts of different Forms.*

| | *l.* | *s.* | *d.* |
|---|---|---|---|
| RECEIVED *September* 23, 1798, of Mr. *Anthony Archer*, the Sum of Six Pounds Nine Shillings; I ſay received for my Maſter *Bryan Barry*, *per* me | 6 | 9 | 0 |

*Caleb Catchmoney.*

| | | | |
|---|---|---|---|
| *London*, *September* 23, 1798.<br>Received of Mr. *Kendrick Keeptouch*, Ten Pounds Eleven Shillings and Sixpence in Full Payment, *per* me | 10 | 11 | 6 |

*Henry Haſty.*

Note, *The Sum received muſt always be expreſſed in Words at length, and not in Figures, in the body of the Receipt; but it may, and ought to be, expreſſed in Figures behind a brace (as in the two foregoing Examples) or elſe between* *two lines on the left-hand of the Name at the bottom of the Receipt (as is ſhewn in the Promiſſory Notes in* p. 153) *as well as in the body of the Receipt.*—For Stamps on Receipts, &c. &c. See page 315.

When a Receipt is given in a Book, there is no occaſion to mention the Man's Name of whom you receive the Money, becauſe that is implied, he being the Owner of the Book.

*A Receipt in part of Goods ſold.*

| | l. | s. | d. |
|---|---|---|---|
| Received the 24th of *September*, 1798, of Mr. *Timothy Truklittle*, Fifty Pounds in part of *Indigo*, ſold him the 22d Inſtant, *per* me | 50 | 0 | 0 |

*Lawrence Lovemoney.*

*A Receipt given in a Receipt Book.*

| | | | |
|---|---|---|---|
| Received the 26th of *September*, 1798, the Sum of Forty-five Pounds, by the Order, and for the Account of *George Greedy*, Eſq. *per* | 45 | 0 | 0 |

*Timothy Truſty.*

| | | | |
|---|---|---|---|
| Received the 27th of *September*, 1798, of Mr. *Daniel Davenport* and Company one hundred Pounds, on Account of Self and Partner, *per* | 100 | 0 | 0 |

*James Jenks.*

| | | | |
|---|---|---|---|
| Received the 28th of *September*, 1798, of Mr. *Peter Punctual*, Fifty-five Pounds Sixteen Shillings and Nine-pence in Part for Tobacco ſold him the 24th of *Auguſt* laſt, *per* | 55 | 16 | 9 |

*Fabian Funk.*

| | | | |
|---|---|---|---|
| Received the 29th of *September*, 1798, of the Honourable *Eaſt India* Company, Three Hundred and Fifteen Pounds Ten Shillings, *per* Order, and for the Account of *Peter Pepper*, *per* | 315 | 10 | 0 |

*Stephen Storax.*

| | | | |
|---|---|---|---|
| Received *October* 2d, 1798, of the Governor and Company of the Bank of *England* One thouſand ſix hundred Pounds Ten Shillings, for Self and Company, *per* | 1600 | 10 | 0 |

*Leonard Longpurſe.*

Received the 5th of *October*, 1798, of the Worſhipful Company of *Grocers*, Forty-nine Pounds Fifteen Shillings, in full Payment for my Father *Peter Plumbe*, *per* me — 49 15 0

*Peter Plumbe*, junior.

Received the 6th of *October*, 1798, of *Richard Clarke*, Eſq. Chamberlain of *London*, the Sum of Sixty Pounds, for the Uſe of the Worſhipful Company of *Joiners*, *per* — 60 0 0

*Caleb Careful.*

*A Rent Gatherer's Bill.*

Received the 24th of *October*, 1798, of Mr. *Aaron Arable*, in Money, Eighteen Pounds, and allowed him for Land Tax Five Pounds, and for Repairs Two Pounds, in all Twenty-five Pounds, in full for half a Year's Rent due at *Michaelmas* laſt; I ſay received for the Uſe of *Lawrence Letland*, Eſq; by Virtue of his Letter of Attorney, *per* — 25 0 0

*Robert Rentroll.*

Received of Mr. *Timothy Tenant*, this 25th Day of *October*, 1798, Six Pounds for a Quarter's Rent due at *Michaelmas* laſt, for my Maſter *Lancelot Letfarm*, *per* — 6 0 0

*Francis Faithful.*

Received *Auguſt* 24, 1798, of Mr. *Brook Biſhop*, Twenty-nine Pounds Six Shillings, in Part of a Bill of Sixty Pounds due, the 3d of *Xber* next, to Mr. *Samuel Shuffle*, *per* — 29 6 0

*Francis Fidell.*

*A Receipt on the Back of a Bill of Exchange.*

*September* 30, 1798, received the full Contents of the within mentioned, being 500 Pieces of Eight, *per* — 500 *Pcs. of* 8

*Nathan Needy.*

## *Promiſſory Notes.*

I Promiſe to pay to Mr. *Timothy Teazer*, or Order, Sixty Pounds, on the 26th of this Inſtant *September*. Witneſs my Hand this 15th of *September*, 1798.

*Daniel Dilatory.*

*l.* 60 0 0

*October* 18th, 1798.

I Promiſe to pay to the Honorable the Directors of the *South Sea* Company, or Bearer, on Demand, Four Hundred Fifty Pounds, for my Father, *James Jones*.

*Joſhua Jones.*

*l.* 450

25th *October*, 1798.

I Promiſe to pay to the Governor and Company of the Bank of *England*, or Order, on Demand, Two Thouſand Pounds.

*Nahum Neednothing.*

*l.* 2000

*October* 24th, 1798.

I Promiſe to pay to *Miles Man*, and Company, or Bearer, on Demand, Seven Hundred Fifty-ſix Pounds Ten Shillings and Nine-pence, for my Maſter, *Robert Regular*.

*Mark Martin.*

*l.* 756 10 9

*October* 25*th*, 1798.

I Promiſe to pay to the Honourable *Eaſt India* Company, or Bearer, upon Demand, Five Hundred Pounds, for *Henry Hudſon*.

*Martin Moneybag.*

*l.* 500

*October* 26*th*, 1798.

I Promiſe to pay to Mr. *Chriſtopher Caſh*, or Order, three Months after Date, Five Pounds, for value received. Witneſs my Hand this 26th Day of *October*, 1798.

*Robert Ruck.*

*l.* 5 0 0

### *A Note given by Two.*

WE, or either of us, promiſe to pay to Mr. *Matthew Miſtruſt*, or his Order, Six Pounds Sterling, on Demand, for Value received. Witneſs our Hands this 27th of *September*, 1798.

*Nathan Needy.*
*Samuel Surety.*

*l.* 6 0 0

*Witneſs* Nicholas Notice.

### *A Bill of Debt.*

Memorandum, That I *William Want*, of *London*, Weaver, do owe, and am indebted unto Mr. *Timothy Truſt*, of *Weſtminſter*, Watch-maker, the Sum of Twenty-five Pounds Six Shillings of lawful Money of *Great Britain*; which Sum I promiſe to pay to the ſaid *Timothy Truſt*, his Executors, Adminiſtrators, or Aſſigns, on or before the 10th Day of *December*, next enſuing. Witneſs my Hand this 22d Day of *October*, 1798. *William Want.*

*Witneſs* Titus Teſtis.

### *Bill of Parcels.*

It is uſual, when Goods are ſold, for the Seller to deliver to the Buyer, with the Goods, a Bill of Parcels, which is a Note of their Contents and Prices, with a Total of their Value caſt up, &c. Theſe Bills ought to be handſomely written, and in a methodical Order, according to the beſt and cuſtomary Way of each particular Trade.

I ſhall therefore ſhew the Form of Bills of Parcels in ſome Trades and Profeſſions, with the ſhorteſt Methods of caſting up the ſeveral Articles in each Bill.

### *A Mercer's Bill.*

*London, September* 26, 1798.

Bought of *Abel Atlas*, and *Ben. Burdett*, *viz.*
12 Yds. ¾ of rich flowered Sattin, at 12*s.* 6*d. per* Yd.
8 Yds. of ſprigged Tabby, at 6*s.* 3*d. per* Yd.
5 Yds. ¼ of Farringdon, at 6*s.* 8*d. per* Yd.
6 Yds. of Mohair, at 4*s.* 2*d. per* Yd.
17 Yds. ½ of Luteſtring, at 3*s.* 4*d. per* Yd.

£. 16 7 8½

Sometimes the Money is paid preſently, then the Receipt is made as follows:

Received the 26th of September, 1798, Sixteen Pounds Seven Shillings and Eight-pence halfpenny, in full of this Bill, for my Maſter *Abel Atlas*, and Company, *per* me

*Francis Fairſpoken.*

### *A Woollen Draper's Bill.*

*London, September 24th,* 1793.

Bought of *Benjamin Broadcloth*, 22d of *September*, 1798, *viz.*

| | | | |
|---|---|---|---|
| 7 Yds. of fine *Spaniſh* Black at | - | 18 | 4 *per* Yd. |
| 5 Yds. ½ of ditto, at - - | - | 12 | 4 ditto |
| 6 Yds. ¼ of fine mixed Cloth, at | - | 15 | 4 ditto |
| 16 Yds. ¾ of Frieze, at - - | - | 3 | 6 ditto |
| 4 Yds. of Drab-de-berry, at - | - | 13 | 5 ditto |
| 5 Yds. ⅞ of ſuperfine *Spaniſh* Cloth, | | 18 | 10 ditto |

### *A Linen Draper's Bill.*

*September 26th,* 1793.

Bought of *Marmaduke Muſlin, viz.*

16 Ells of Dowlas, at 1*s.* 4*d. per* Ell.
14 Ells of Lockram, at 1*s.* 3*d. per* Ell.
32 Ells ½ of Holland, at 3*s.* 5*d. per* Ell.
1 Piece of Cambric, at 15*s.*
85 Yds. ½ of Diaper, at 1*s.* 10*d. per* Yd.
19 Yds ¾ of Damaſk, at 4*s.* 3*d. per* Yd.
2 Pieces of Muſlin, at 18*s.* 10*d. per* Piece.

The ſeveral Articles of theſe Bills are purpoſely omitted being caſt up, for the Exerciſe of the Reader in the Rule of Practice, or in thoſe of *Multiplication* of *Money*, before ſhewn; which indeed is the beſt Method of all, for the ready caſting up the Articles contained in any Bill of Parcels whatſoever.

We'll take the laſt Article of the Woollen-Draper's Bill, *viz.* 5 Yds. ⅞, *&c.* at 18*s.* 10*d. per* Yard.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | 5⅞ | | | 18 | 10 |
| | | | | | | | 7 |
| *l.* | 4 | 14 | 2 | | | | |
| | | 16 | 5¾ | | 8) | 131 | 10 |
| *Facit l.* | 5 | 10 | 7¾ | | | 16 | 5¾ |

In this Example the Price is multiplied by the Quantity, *viz.* 5 Yards ⅞, according to the Rules delivered in *Multiplication*

*lication of Money*; and the Product by 5 is *l.* 4—14—2: Then for the $\frac{7}{8}$ of a Yard, I multiply the Price of the Integer, *viz.* 18*s.* 10*d.* by the Numerator of the Fraction, *viz.* 7, and divide by the Denominator 8, and the Quotient is 16*s.* 5*d.* $\frac{3}{4}$, agreeable with the Rule ſpoken to in the Doctrine of Fractions.—Which 16*s.* 5*d.*$\frac{3}{4}$ added to the Product of 18*s.* 10*d.* multiplied by 5, gives *l.* 5—10—7$\frac{3}{4}$ as in the Operation above.

### *A Grocer's Bill.*

Bought of *Robert Raiſin*, and *Peter Plumb*, *October* the 4th, 1798, *viz.*

| | *C.* | *qrs.* | *lb.* | *l.* | *s.* | *d.* | |
|---|---|---|---|---|---|---|---|
| Sugar 2 Hhd. qt. - | 17— | 2— | 17 | at 1 | 10 | 6 | *per C.* |
| Raiſins 3 Barrels - - | 6— | 1— | 19 | at 1 | 14 | 5 | |
| Tobacco 1 Hhd. - | 4— | 0— | 12 | at 4 | 19 | 4 | |
| Rice 1 Barrel - - | 1— | 0— | 15 | at 2 | 16 | 4 | |
| Pepper 1 Bag - - | 1— | 3— | 19 | at 3 | 12 | 4 | |
| Brimſtone - - - | 2— | 1— | 19 | at 1 | 19 | 1 | |

### *A Hoſier's Bill.*

Bought of *Silveſter Slipſtocking*, *October* 5, 1798, *viz.*

| | | |
|---|---|---|
| 5 Pair of Womens mixt Worſted Hoſe, at | 5*s.* | 7*d.* |
| 3 Pair of Womens Silk Hoſe, at - - | 9*s.* | 4*d.* |
| 22 Pair of Mens Woollen ditto, at - - | 3*s.* | 2*d.* |
| 8 Pair of Womens ditto, at - - - | 2*s.* | 2*d.* |
| 21 Yds. of Flannel, at - - - - - | 1*s.* | 11*d.* |
| 8 Pair of Thread Hoſe at - - - | 3*s.* | 4*d.* |

### *A Fiſhmonger's Bill.*

Bought of *Leonard Ling*, 6th of *October*, 1798.

| | *l.* | | | |
|---|---|---|---|---|
| 3 *C.* of Haberdine, at - - | 7 | 10 | 6 | *per C.* |
| 1 $\frac{1}{2}$ of Ling, at - - - | 0 | 12 | 6 | |
| 1 *C.* $\frac{1}{2}$ of Stock Fiſh, at - - | 4 | 10 | 5 | |
| 1 Barrel of Red Herrings - | 2 | 12 | 6 | |
| 95 Dried Salmon, at - - | 0 | 12 | 2 | |

---

Note, *Of Haberdine or Ling*, 124 *is a Hundred*; *of Stockfiſh and Herrings*, 120 *to the Hundred*, 1200 *to a Thouſand, and* 12 *Barrels to a Laſt.*

*A*

### *A Leatherſeller's Bill.*

Bought of *Henry Hide*, the 17th of *October*, 1798, *viz.*

| | s. | d. |
|---|---|---|
| 15 Large oil'd Lamb Skins, at | 1 | 3 ½ *per* Skin. |
| 13 Kipp of Goat Skins, at - - | 3 | 4 |
| 107 Allum'd Sheep Skins, at - - | 1 | 3 |
| 19 Calf Skins, at - - - | 4 | 3 |
| 85 Oil'd Buck Skins, at - - | 12 | 9 |
| 10 Ruſſia Hides, at - - - | 12 | 9 |
| 60 Dicker of Hides, at - - | 11 | 6 |

Note, 50 *Goat Skins make a Kipp; and other Skins are Five Score to the Hundred. A Dicker is* 10 *Hides or Skins; and* 20 *Dickers a Laſt.*

### *A Pewterer's Bill.*

Bought of *Andrew Antimony*, *October* the 7th, 1798, *viz.*

| | l. | s. | d. |
|---|---|---|---|
| 9 Hard Metal Diſhes, wt. 42 at 14*d. per lb.* | 2 | 9 | 0 |
| 1 Dozen of ditto Plates - - - - | 0 | 17 | 0 |
| 1 Chamber-pot of ditto - - - | 0 | 4 | 0 |
| 1 Standiſh of ditto - - - - | 0 | 4 | 0 |
| 2 Tankards of ditto - - - - | 0 | 5 | 10 |
| 8 Beſt Spoons - - - - - | 0 | 4 | 6 |
| 13 Hard Metal Porringers - - - | 0 | 3 | 0 |
| 1 Salt of ditto - - - - - | 0 | 1 | 10 |
| 1 Set of Caſtors - - - - - | 0. | 10 | 0 |
| | 4 | 19 | 2 |

### *Bills on Book Debts.*

### *A Woollen Draper's Bill.*

Mr. *Francis Frieze*, Dr.

| 1798 | | s. | d. |
|---|---|---|---|
| *April* 20 | To 16 Yds. ½ of Black Cloth, at - - | 18 | 3 *per* Yd. |
| ditto 24 | To 4 Yds. ⅛ of Drap-de-berry, at - - | 15 | 6 |
| *May* 4 | To 35 Yds. of mixt Grey Cloth, at - - | 10 | 5 |
| 17 | To 9 Yds. of fine ditto, at | 17 | 3 |
| *June* 12 | To 12 Yds. ½ of fine Broad Cloth, at - - | 17 | 3 |

If the Gentleman pays the whole Bill, then make the Receipt thus:

| | |
|---|---|
| Received the 19th of *October*, 1798, of Mr. *Francis Frieze*, the Sum of Fifty-four Pounds, in full for this Bill, and of all Accounts, for my Maſter, *David Draper*. | *l.*<br>54 |

Per *Michael Meaſurewell*.

*A Mercer's Bill.*

| 1798 | | Madam *Dinah Dilatory*, Dr. to *Bryan Brocade* viz. | | | |
|---|---|---|---|---|---|
| | | Yds. | *s.* | *d.* | |
| *March* | 16 | To 16½ of flowered Sattin, at | 14 | 9 | *per* Yd. |
| *April* | 14 | To 14 of *Venetian* Silk, at | 11 | 8 | |
| ditto | 16 | To 99 of Mohair, at - | 6 | 3 | |
| *May* | 16 | To 14½ of flowered Damaſk, at | 9 | 7 | |
| *June* | 7 | To 5⅛ of *Genoa* Velvet, at | 21 | 6 | |
| ditto | 25 | To ¾ of Luſtring, at - | 4 | 7 | |

If Part of the Bill is paid, write thus:

| | | | |
|---|---|---|---|
| Received of Madam *Dinah Dilatory*, Twelve Pounds, Ten Shilling, in Part of Payment for my Maſter, *Bryan Brocade*; *per Henry Hunter*. | *l.*<br>12 | *s.*<br>10 | *d.*<br>0 |

*A Corn Chandler's Bill.*

| 1798 | | Mr. *Robert Racer*, Dr. to *Lionel Livery*. | | | |
|---|---|---|---|---|---|
| | | | *s.* | *d.* | |
| *April* | 24 | To 5 Quarters of Oats, at | 3 | 3 | *per* Buſhel. |
| *May* | 16 | To 9 Buſhels of Beans, at | 4 | 10 | |
| *June* | 19 | To 7 Buſhels of Bran, at | 1 | 10 | |
| | | To 19 Buſhels of Oats, at | 1 | 11 | |
| ditto | 25 | To 16 Buſhels of Beans, at | 3 | 11 | |

*A Tobac-*

### *A Tobacconiſt's Bill.*

| 1798 | | Mr. *Francis Funk*, Dr. to *Richard Raiſecloud*, viz. | *d.* |
|---|---|---|---|
| *May* | 1 | To 1 Hhd. of Tobacco, qt. nett, 596*lb.* at——— ——— | 10½ *per lb.* |
| ditto | 25 | To 1 Box, qt. 75¼ *lb.* nett, at——— | 11¼ |
| *June* | 4 | To 5 Bags of old *Spaniſh*, qt. nett, 671*lb.* at - - - - | 3½ |
| *July* | 12 | To ½ Hhd. qt. 334 Groſs, Tare 42, nett 293*lb.* at - - - - | 5¼ |
| *7ber* | 7 | To 2 Rolls of Tobacco, qt. 94*lb.* at | 9¼ |

### *A Stationer's Bill.*

| 1798 | | Mr. *Siſcera Scribbler*, Dr. to *Phineas Foolſcap*, viz. | | | |
|---|---|---|---|---|---|
| | | Reams. | *s.* | *d.* | |
| *July* | 12 | To 57 of Demy Paper, at | 20 | 9 | *per R.* |
| ditto | 31 | To 195 of 2d Foolſcap, at | 16 | 3 | |
| *Aug.* | 24 | To 375 of 2d Demy, at | 18 | 2 | |
| *7ber* | 6 | To 95 French Royal, at | 32 | 6 | |
| *8ber* | 26 | To 26 Rolls of Parchment, at | 45 | 11 | |

Note, *A Roll of Parchment is* 60 *Skins*; *a Ream of Paper* 20 *Quires*; *and a Bale of Paper* 10 *Reams.*

### *A Bricklayer's Bill.*

| 1798 | | Mr. *Martin Meſſuage*, Dr. to *Peter Pantile*, viz. |
|---|---|---|
| *March* | 27 | To 25 Thouſand Bricks, at 16*s.* *per* M. |
| ditto | 30 | To 11 Thouſand Plain Tiles, at 20*s.* 6*d.* *per* M. |
| *April* | 1 | To 28 C. of Lime at 12*s.* *per* C. |
| ditto | 9 | To 20 Loads of Sand, at 3*s.* 6*d.* Load. |
| *May* | 20 | To 140 Ridge of Tiles, at 8*s.* 6*d.* *per* C. |
| *June* | 24 | To 90 Days of Work myſelf, at 3*s.* *per* Day. |
| | | To 90 Days my Man, at 2*s.* 6*d.* |
| | | To 90 Days another Bricklayer, at 2*s.* 6*d.* |
| | | To 90 Days for 2 Labourers at 20*d.* a Day each. |

Note, 1000 *plain Tiles is a Load*; *and* 25 *Bags or Buſhels of Lime* 1 C. *A Brick muſt be* 9 *Inches long, and* 4 *Inches* ½ *broad. Bricks are of three Sorts,* Place Bricks, Red and Grey Stock Bricks.

Here it will be convenient to give a General Rule for the caſting up any Thing to be ſold by the Thouſand; as Bricks, Tiles, Clinkards, or *Flanders* paving Bricks, and ſeveral other Things mentioned in the Book of *Rates*, *viz.* Barrel Hoops, Gooſe Quills, Oranges and Lemons, Squirrel Skins, Billets, *&c.*

*And the eaſy Rule is this*, viz.

Multiply the given Number by the Shillings in the Price, (if the Price be at ſo many Shillings *per* M). and always cut off three Figures or places towards the Right-hand; and the Figures towards the Left-hand are Shillings, which divide by 20, to bring them into Pounds; and thoſe Figures ſeparated toward the Right-hand, multiply by 12, the next inferior Denomination, and ſtill cut off or ſeparate three Places towards the Right-hand, and the Figures toward the Left are Pence; and the three laſt Figures cut off, multiply by 4; and ſtill ſeparate three Places towards the Right-hand, and the Figures towards the Left-hand are Farthings.——And if the Price be Shillings and Pence, or Shillings, Pence and Farthings *per* Thouſand, then multiply by the Shillings as before, and take Parts for the Pence and Farthings, as in the Rule of *Practice*; add theſe together, and proceed as above directed.

*Example* 1.

```
    24650  Bricks at 17s. per Thouſand.
       17
   ------
   172550
   24650
 --------
 419 | 650  Anſwer 419s. 0½d. or 20l. 19s. 0½d.
        12
     -----
   0 | 600
         4
     -----
   2 | 400
```

*Example*

### *Example* 2.

*6d.*—½ 261324 Plain Tiles at 16*s.* 6*d.* *per* Thouſand.

$$\left.\begin{array}{r}
16 \\
\hline
1567944 \\
261324\phantom{0} \\
130662 \\
\hline
4311 \mid 846 \\
12 \\
\hline
10 \mid 152 \\
4 \\
\hline
608
\end{array}\right\}
\begin{array}{l}
\textit{Anſwer } 4311s.\ 10d.\ \frac{608}{1000}f. \\
\text{or } 215l.\ 11s.\ 10d.
\end{array}$$

When Things are ſold by the Hundred, as *Dutch* and *Engliſh* Pantiles, then follow this Rule, *viz.*

Multiply the given Quantity by the Shillings in the Price, and take Parts for the Pence and Farthings (if any be) as before; then from the Right-hand of the Sum cut off two Places, and proceed as in the laſt Rule.

### *Example* 3.

1726 Pantiles, at 7*s.* *per* C.

$$\left.\begin{array}{r}
7 \\
\hline
120 \mid 82 \\
12 \\
\hline
9 \mid 84 \\
4 \\
\hline
3 \mid 36
\end{array}\right\}
\begin{array}{l}
\textit{Anſwer } 120s.\ 9d.\ \frac{3}{4} \text{ or } 6l.\ 0s.\ 9d\ \frac{3}{4} \text{ and} \\
\frac{36}{100} \text{ of a Farthing.}
\end{array}$$

*Example.*

### *Example.*

6*d.*—½ 2964 Stock Bricks, at 2*s.* 6*d. per* C.

```
        2
     ----
     5928
     1482
     ----
  74 | 10
       12
      ---
   1 | 20
        4
     ----
     —80
```

*Anſw.* 74*s.* 1*d.* $\frac{80}{100}$ *f.* or 3*l.* 14*s.* 1*d.* *&c.*

## *Of Bills of Exchange.*

BILLS of Exchange are either Inland, or Foreign. The Inland Bills are drawn by one Trader in one City or Town, upon another of another City or Town, in the ſame Kingdom; as *London* upon *Briſtol*, or *Exeter* upon *London*, *&c.* and theſe chiefly concern our Shop-keepers, and wholeſale Traders, either of Town or Country; and the Foreign more immediately concern the Merchants.

*Bills of Exchange*, if handſomely drawn, muſt be written in a fair Hand, on a long Piece of Paper, about three Inches broad, and written in Form after the following Precedents.

### *A Bill payable at Sight.*

*London, 5th October,* 1798.

AT Sight hereof, pay to Mr. *Gregory Greedy*, or his Order, the Sum of Fifty Pounds, for Value received of *Chriſtopher Caſh*; and place it to Account, as *per* Advice from

*To Mr.* Peter Punctual, Your humble Servant,
*Grocer, in High-ſtreet,*
Briſtol. *Daniel Drawbill.*

*Note*, A Bill at Sight is payable three Days after the Acceptor ſeeth it.

*Exon, Nov.* 1798.

SEVEN Days after Sight hereof, pay to Mr. *Nathan Needy*, or his Order, twenty-four Pounds, ten Shillings, for the Value received here of Mr. *Timothy Tranſfer*, and place it to Account, as *per* Advice from

*To Mr.* Simon Certain, Your Friend and Servant,
*Haberdaſher*, in Milk *Michael Moneyman.*
Street, London.

If Mr. *Needy* ſends his Servant, *Andrew Benſon*, to receive the Money, after he has written his Name on the Back of the Bill, (which is his Order) the Servant muſt write a Receipt to his Maſter's Name, thus:

*RECEIVED*, November 16, 1798, *the full Contents of the within-mentioned Bill, being twenty-four Pounds, Ten Shillings.*

Witneſs, *Nathan Needy.*
*Andrew Benſon.*

*A Foreign Bill of Exchange.*

*London*, 6th *October*, 1798, for 460 Crowns, at 56*d*. $\frac{3}{8}$ Sterling *per* Crown.

AT Uſance pay this my firſt Bill of Exchange, (my ſecond or third not being paid) unto Mr. *Henry Vernon*, or Order, Four Hundred and Sixty Crowns, at 56*d*. $\frac{3}{8}$ *per* Crown, for the Value received of Mr. *Samuel Tompſon*, and paſs it to Account, as *per* Advice from, Sir,

*To Mr.* Will. Walker, Your humble Servant,
*Merchant* in Paris. *Ebenezer Reynolds.*

*Another.*

*London*, 17th *October*, 1798, for 480 Dollars, at 55*d*. $\frac{1}{8}$ *per* Dollar.

AT three Uſance pay this my firſt Bill of Exchange unto Mr. *William Wealthy*, or Order, Four Hundred and Eighty Dollars, at 55*d*. $\frac{1}{8}$ Sterling, *per* Dollar, for the Value received of himſelf, and place it to Account, as *per* Advice from

*To Mr.* Daniel and Your humble Servant,
David Bernardiſton, *Mark Mercator.*
*Merchants* in Aleppo.

Note, *Uſance* between *England* and *France*, or *Holland*, is one Calendar Month; between *England* and *Spain*, or *Portugal*, two Months; between *England* and *Italy*, three Months, *&c.*

### *Once more.*

*Briſtol*, 8th *October*, 1798, for 600 Pieces of Eight,
53*d.* ⅜ *per* Piece.

AT double Uſance pay this my firſt Bill of Exchange unto Mr. *Lawrence de Luz*, or his Order, Six Hundred Pieces of Eight *Mexico*, at 53*d.* ⅜ Sterling *per* Piece of Eight, for Value received of *Gomes Henriques*, and paſs it to Account, as *per* Advice from your's,

*To Mr.* Simon Surepay, *William Henry Hern.*
*Merchant* in Leghorn.

### Notes on Bills of Exchange.

1. *THE Acceptor of any Bill is become abſolute Debtor to the Perſon to whom the Bill is payable for the Contents thereof.*
2. *The Perſon to whom the Bill is payable muſt demand the Money the very Day it becomes due, and if the Acceptor dies before it becomes due, it muſt be demanded of the Executor or Adminiſtrator.*
3. *The Drawer of any Bill muſt always give his Correſpondent a Letter of Advice, that he hath drawn ſuch a Bill on him for ſuch a Sum,* &c.
4. *None may pay a Bill without ſuch Letter of Advice.*
5. *In* England *a Bill is due the third Day after the Expiration of the Time mentioned in the Bill.*

### *Of Indorſing.*

IT frequently happens, that between the Acceptance of a Bill and the Time of Payment, the Party to whom it is firſt made payable, hath Occaſion to pay it away. If ſo, he writes his Name on the Back of the Bill, which is his Order, (as ſaid before) and gives it to the Perſon he is indebted to, and then he is impowered to receive the Money: And it may be, the ſecond Perſon alſo wants to pay it away, and then he likewiſe writes his Name under the other, and delivers it to a third Perſon to receive the Money; and it may be, the third does the ſame, and delivers it to a fourth

Perſon, *&c.* All that do ſo, are Endorſers; and he that laſt hath the Bill, if the Acceptor will not pay it, may ſue him, or the Indorſers, or Drawer, or any of them, for the Money.

An Indorſement is generally in theſe Words, *viz. Pay the Contents of the within-mentioned Bill to* Henry Haſty.

*George Greedy.*

But generally the Name only is accounted ſufficient.

### *Of Proteſting.*

WHEN a Bill is to be *Proteſted,* the Party that hath the Bill muſt go to a *Public Notary* (not a common *Scrivener)* whoſe Buſineſs it is; and he goes with you to the Acceptor's Houſe, and demands Payment, *&c.* And then he draws up a *Proteſt* according to Law; which is to be returned to the Drawer within the Time limited, *&c.*

It is needleſs to give here the Form of a *Proteſt,* becauſe no Man can do it of himſelf.

### *A Bill of Debt.*

*KNOW all Men by theſe Preſents, That I* Lawrence Lackcaſh, *of* Southwark, Vintner, *do owe and am indebted unto* Charles Creditman, *of the ſame Place,* Salter, *the Sum of one Hundred and Fifty Pounds of lawful Money of* Great Britain; *which ſaid Sum I promiſe to pay unto the ſaid* Charles Creditman, *his Executors, Adminiſtrators, or Aſſigns, on or before the* 24*th of* December *next enſuing the Date hereof. Witneſs my Hand and Seal this* 6*th Day of* October, 1798.

Sealed and delivered
in the Preſence of Lawrence Lackcaſh.

### *A Bill for Money borrowed.*

*Received and borrowed of* Oliver Overcaſt, *of* London, *Merchant, Fifty Pounds, which I do hereby promiſe to pay on Demand. Witneſs my Hand this* 6*th Day of* October, 1798.

*l.* 50. Peter Penny.

## *The Charge of Noting and Proteſting a Bill.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Noting | within the City | 1 | 6 | Pro- | within | 3 | 0 |
| | without the City | 2 | 6 | teſting | without | 5 | 0 |

## *The Form of a Bill Lading.*

Shipped by the Grace of God, in good Order and well-conditioned, by *Edward Export*, of *London*, Merchant, in and upon the good Ship, called the *(Bilboa Merchant of London)* whereof is Maſter under God for this preſent Voyage *(Martin Mizen of London*, Mariner,) and now riding at Anchor in (the Port of *London)* and by God's Grace, bound for *(Cadiz)* to ſay 1 (Bale of Stocking Baize, and 1 Trunk, containing five hundred Pair of Silk Stockings, Contents, *&c.* as *per* Invoice) being marked and numbered as *per* Margin, and are to be delivered in the like good Order at the aforeſaid Port of *(Cadiz)* the Danger of the Seas only excepted, unto (Mr. *Thomas Drake*, Merchant, there) or to his Aſſigns, he or they paying Freight for the ſaid Goods (three Pieces of Eight *per C.* Wt.) with Primage and Average accuſtomed. In witneſs whereof the Maſter or Purſer of the ſaid Ship hath affirmed to (three) Bills of Lading, all of this Tenor and Date, one of which (three) Bills being accompliſhed, the other (two) to ſtand void. And ſo God ſend the good Ship to her deſired Port in Safety. *Amen.*

T B
No.
1, 2

Dated in *London*, the 6th of *October*, 1798, Inſide and Contents unknown to *Martin Mizen.*

Note, *The ſeveral Words included in the Parentheſes, are to be put into the ſeveral vacant places that are in a Blank Bill of Lading.*

Note alſo, *Average is the general Allowance made to the Maſter of the Ship, of 1d. or 2d in every Shilling Freight; Primage, a ſmall Allowance to be diſtributed among the Sailors.*

## *The Form of an Invoice.*

*Port Royal in Jamaica, July* 24, *Anno* 1798.

Invoice of five Barrels of Indigo, five Hhds. of Sugar, and five Hhds. of Pimento, ſhipped on board the *George* of *London*, *George Jones*, Commander, for Account and Riſk of Meſſrs. *John* and *Thomas Fiſher* of *London*, Merchants, being marked and numbered, as *per* Margin: Contents, Coſts and Charges, as in the following Example.

| *viz.* | Indigo 5 B | | *l.* | *s.* | *d.* |
|---|---|---|---|---|---|
| I F. | 143 | | | | |
| No. | 143 | | | | |
| 121 | 146 | | | | |
| to | 152 | | | | |
| 125 | 172 | | | | |
| | 756 *lb.* Nett. at 2*s.* 2*d.* *per lb.* | | 81 | 18 | — |
| | Sugar 5 Hhds. Tare | | | | |
| | *C. qr. lb.* *C. qr. lb* | *C. qr. lb.* | | | |
| 126 | 11-3-27—1-2-19 | Groſs 68-0-0 | | | |
| to | 12-2-19—1-3-0 | Tare 8-3-12 | | | |
| 130 | 13-2-13—1-2-16 | | | | |
| | 14-1-15—1-3-11 | Nett 59-0-16 | | | |
| | 15-1-10—1-3-22 | at 24*s.* *p. C.* | 70 | 19 | 5 |
| | 68-0-0—8-3-12 | | | | |
| | Pimento | *lb.* | | | |
| | 5 Hhds. Tare | 2026 Groſs | | | |
| No. | *lb.* *lb.* | 389 Tare | | | |
| 131 | 432—84 | | | | |
| | 396—72 | Nett 1637 at 11*d.* ½ *per lb.* | 78 | 8 | 9½ |
| 135 | 410—81 | | | | |
| | 376—70 | Charges. | | | |
| | 412—82 | To Coſt of 5 Barrels and 10 Hhds. 4-7-9 | | | |
| | 2026-389 | To Storage 1-0-0 | 5 | 7 | 9 |
| | | | 236 | 13 | 11½ |
| | | To Commiſſion at 5 *per C.* | 11 | 16 | 7¾ |
| | | Errors excepted *per A. B.* | | | |

## *An Account of Sales.*

*Port Royal in Jamaica, July 24th,* 1798.

Account of Sale of 2765 Ells of brown Ozenbrigs, 1112 Yards of Blue Hartford, 2 Pieces of Grey Cloth, qt. 39 Yards, 50 Pair of fine Worſted Hoſe, and 175 Ells of Bag Holland, received from on board the Ship *Good Succeſs*, Captain *Samuel Sharp*, Commander, for Account of *Lawrence Lucky*, of *London*, Merchant, is Dr.

| | | | | l. | s. | d. |
|---|---|---|---|---|---|---|
| To Portage of ditto | l. 0 | 17 | 6 | | | |
| To Commiſſion of Sales | 13 | 1 | 11 | | | |
| To Storage at ½ *per C.* | 6 | 10 | 11½ | | | |
| | | | | 20 | 10 | 4½ |
| To the Nett Product carried to the Credit of your Account, bad Debts excepted | | | | 247 | 6 | 4½ |
| | | | | 267 | 16 | 9 |
| *Per Contra*, Cr. | | | | | | |
| By 2765 brown Ozenbrigs, making 3456 Yds. ¼ at 8*d.* ½ *per* Yd. ſold *Ambique Baker* | | | | 122 | 8 | ½ |
| By 1112 Yds. of blue Linen, ſold at 7*d.* ¾ *per* Yard | | | | 35 | 18 | 2 |
| By *James Smart*, for 39 Yds. of Cloth, at 15*s. per* Yard | | | | 29 | 5 | 0 |
| By *Lawrence Monk*, for 50 Pair of Hoſe, at 7*s.* 10*d. per* Pair | | | | 19 | 11 | 8 |
| By ditto for 175 Ells of Bag Holland, at 6*s.* 3*d. per* Ell | | | | 54 | 13 | 9 |
| | | | | 261 | 16 | 9 |

Errors excepted, *July 24th*, 1798, *per*
*Charles Careful.*

### *Buſineſs at the Waterſide, concerning Exporting and Importing of Goods,* &c. *Entering them at the Cuſtom houſe,* &c.

When there are Goods to export, and ready packed, &c. there muſt be firſt made a Bill of Entry, (as it is called) of the Contents, after this Form, *viz.*

*In the Loyal Merchant, William Worm, for Barbadoes.*
*Edwin Export:*

Three Caſes of Haberdaſhery.
Five Tuns of Beer, *&c.*

Of theſe Bills there muſt be ſeven, one of which muſt be in Words at length, and the other may be expreſſed in Figures: Theſe are by the Clerks of the Cuſtom-houſe entered into ſeveral Books for that Purpoſe. If ſome Goods pay Cuſtom, and others not, then there muſt be made two Entries; one for thoſe that pay Cuſtom, and another for thoſe that pay not; and likewiſe you muſt have two Cockets.

A *Cocket* teſtifies the Payment of all Duties; and is written on a ſmall Piece of Parchment in the following Words:

> *Know ye, that* Edwin Export, *Merchant, for three Caſes of Haberdaſhery, and five Tuns of Beer, in the* Loyal Merchant, William Worm, *for* Barbadoes, *hath paid all Duties. Dated the 9th of* November, 1798.

On the Backſide of the *Cocket* you muſt ſet down the Marks, Numbers, and Quantity of the Goods expreſſed in the Inſide. Then on clean Paper tranſcribe your Bill of Entry, upon which a Shipping Bill will be made out, on the Back of which, ſignify the Marks, Numbers, and Contents, as before on the *Cocket*; both which being thus endorſed, you are to deliver them to the Searcher at the Water-ſide, who depoſits them in the Office till the going away of the Ship, and then they are delivered to the Captain or Maſter of the Ship.

If you have not Judgment or Experience enough to enter your Goods yourſelf, it is but applying to any one of the Clerks in the Long-room, who make it their Buſineſs (and good Buſineſs too) to enter People's Goods; and for a Shilling (you giving them the Contents) they will write your Bills, and paſs your Entries, without giving you any farther Trouble, or your running any Riſque of making any falſe Entries, *&c.*

### *Entry Inwards.*

THE Ship being arrived, ſearch the Entry-book in the Long-room, and you will find the Name of the Ship and Captain, as alſo the Waiters that are to attend the Delivery of the Ship, and at what Key the Goods will be landed. The Entry inwards runs thus:

*In the* Mercury, John Keelhaul, *from* Antigua.

25 Hhds. of Sugar, *&c.*

56 Bags of Cotton, *&c.*

There muſt be eight of theſe Bills, (though but ſeve Outwards) and one of theſe muſt be in Words at Lengt (as well as one of the ſeven Bills outwards) which is for th Warrant of Delivery, and muſt be ſigned by the Perſon i whoſe Name the Goods were entered, and the Mark alſ in the Margin; which being done, and the Fee for Entry and Cuſtom paid, you will then have from the Land Waiters a Warrant for the landing and receiving your Goods

When Goods are to be exported by Certificate, *viz* Foreign Goods formerly imported; theſe Goods being t be ſent Abroad, or exported to another Place or Countr by a Native of *England* within Twelve, or a Stranger within Nine Months after Importation, entitles the Exporte to a Drawback of Part of the Cuſtom paid at the Importation of the ſaid Goods (producing a Certificate from th Comptroller, that they have paid the Duties inwards And the Debenture of Cuſtom Drawback runs thus:

### *Debenture.*

Chriſtopher Commerce, *natural born, did on,* &c. *mak an Entry with us of Two Thouſand* Ells *of broad* Germa *Linen, in the* Amazon, *Captain* Stephen Stout, *for* Jamaica *the Subſidy,* &c. *was paid inwards by,* &c. *as appears* pe *Certificate of the Collector inwards:* And *for further Manifeſtation of his juſt Dealing therein, he hath alſo taken Oat before us of the ſame.*

Cuſtom-houſe, London, 9th November, 1798.

### The Oath.

Jurat. C. C. *That Two Thouſand Ells of broad* Germany *Linen, abovementioned, was really ſhipped out, and hath n been relanded in any Port or Creek in* England *or* Wales, *ſinc laſt ſhipped,* Nov. 9, 1798.

### The Certificate Cocket.

London; *Know ye, that* C. C. *for Two Thouſand Ells o broad* Germany *Linen, paid per &c. the Day,* &c. *laſt, lat unladen and now in the* Amazon, Stephen Stout, *for* Jamaica. *Dated the 9th of* November, 1798.

This *Certificate Cocket* is gained by applying to the Book of the Importer, to know the Day, *&c.* when the Cuſto Inwards was paid, and by whom; which carry to the Long room in the *Cuſtom-houſe*, and deliver it to the Comptroller

Cler

Clerk of the Subſidy inward and outward, with an Account of what you would export, *&c.*

A little before was mentioned at what Key the Goods ſhould be landed, and therefore here it is proper to name the Keys (or rather Quays) and Wharfs that Goods are uſually landed at, which are theſe, *viz.*

*Somer's Key, Smart's Key, Wiggen's Key, Bear Key, Dice Key, Cuſtom-houſe Key, Potter's Key, Wool Key, Galley Key, Brewer's Key, Ralph's Key, Cheſter's Key, Lyon's Key, Cox's Key*; *Hammond's, Young's,* and *Gaunt's Key.* And the Wharfs are, *Freſh Wharf* and *Botolph Wharf.*

Beſides theſe, there are certain Places called *Docks,* which are Harbours cut into the Land, where there is no Current, but only a Flow and an Ebb, occaſioned by the Riſe and Fall of the Tide in the River *Thames*; and theſe are convenient for the lying of Veſſels, Hoys, Lighters, Barges and Boats; and are theſe, *viz.*

*Billingſgate Dock, Sabb's Dock, Tower Dock, St. Catherine's Dock, Wapping Dock, Hermitage Dock, Execution Dock,* and *Limehouſe Dock.* And above Bridge, *Queenhithe Dock, Puddle Dock, White Friars Dock,* and *Scotland Yard Dock.* And on *Southwark,* or *Surry Side* are, *Saviour's Dock, Clink Dock,* and *Savery's Dock,* below the *Bridge Yard,* and ſeveral others for private Uſes. But more particularly eminent on that Side of the Water, is the *Bridge Yard* for landing ſundry Sorts of Merchandizes, but chiefly from the Ports of *England.*

### *Of Wharfage and Lighterage.*

WHARFINGERS have ſeveral Managers over them, and alſo a Committee to redreſs Grievances, *&c.* and Clerks of the Stations, with Lighter Managers, and have the letting of many Warehouſes (which now are very fine and commodious, being rebuilt ſince the ſad Fire in *Thames-ſtreet*) Cellars, &c. and have the Privilege of keeping Lighters for the Carriage of Goods to and from Ships.

### *The Rates of Wharfage*

Are generally computed at 12*d.* *per* Ton, whether outward or inward; excepting Sugars from the *Weſt-Indies,* which pay 2*s.* *per* Ton, 4 Hogſheads being accounted a Ton (though they weigh more.) Cranage is included in the 12*d.* *per* Ton Wharfage; and for Lighterage, the Wharfingers have 12*d.* for 4 Hogſheads of Sugar that come from the *Weſt Indies*; and for Wine and other Goods the Lighterage is half as much as the Wharfage.

### *Huſbands of Ships.*

WHERE ſeveral Perſons are concerned in a Ship, there is uſually a Huſband choſen by them, to take an Account of every Merchant's Goods, &c. and pay the Wharfage, Lighterage, Porterage, &c. and theſe Huſbands are to collect every Merchant's Proportion, when they do the Owner's Freight.

### *Of Menſuration of Planes and Solids.*

THE ſeveral Kinds of Meaſuring are three, *viz.*

1*ſt*. *Lineal*, by ſome called *Running Meaſure*, and i taken by a Line, and reſpects Length without Breadth; the Parts of which are,

12 Inches 1 Foot, 3 Feet 1 Yard, 16 Feet and a half 1 Rod, Pole, or Perch.

All Kinds of ornamental Work, ſuch as a Cornice, Frieze, &c. are meaſured by *Running Meaſure*.

2*dly*, *Superficial* or Square Meaſure, is that which reſpects Length and Breadth; and the Parts are,

144 Inches 1 Foot, 72 Inches half a Foot, 36 Inches one Quarter of a Foot, 18 Inches half a Quarter of a Foot, 272 Feet and a Quarter 1 Rod, 136 Feet half a Rod; 1296 Inches, or 9 Feet, one ſuperficial, or ſquare Yard.

3*dly*, *Solid*, or Cube Meaſure, which reſpects Length, Breadth, and Depth, or Thickneſs; and the Parts are,

1728 Inches 1 Foot, 1296 Inches three Quarters of Foot, 864 Inches half a Foot, 432 Inches one Quarter o a Foot, and 27 Feet one Solid Yard.

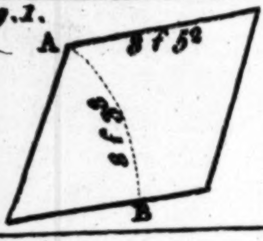
### *Superficial Meaſure.*

TO meaſure Things that have Length and Breadt ſuch as Board, Glaſs, Pavement, Wainſcot, and Land, i to take the Dimenſions of the Length and Breadth, according to the cuſtomary Methods uſed in each particular; for inſtance, Board and Glaſs are meaſured by th Foot, the Dimenſions are taken in Feet and Inches, an the Content given in Feet.

Th

*Place this at the begining of Measuring*

Fig. 1.



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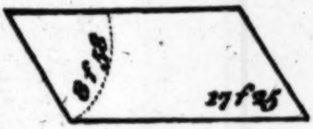

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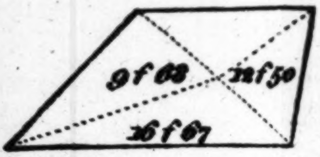

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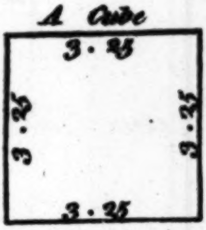

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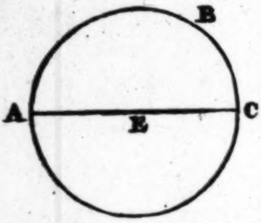

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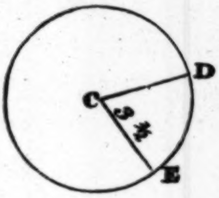

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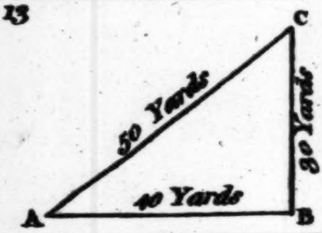

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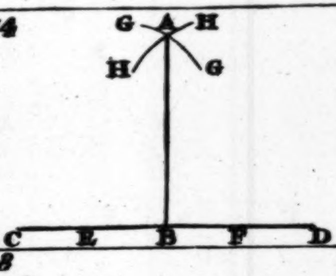

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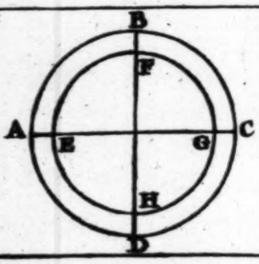

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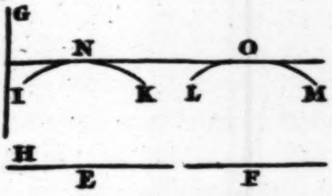

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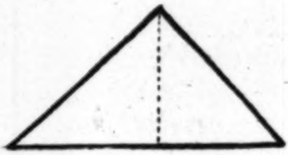

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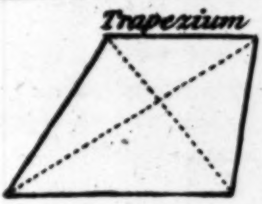

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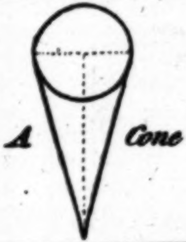

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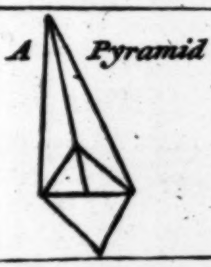

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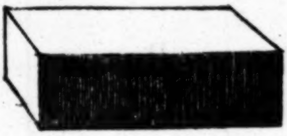

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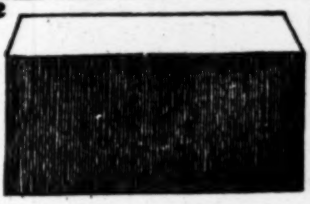

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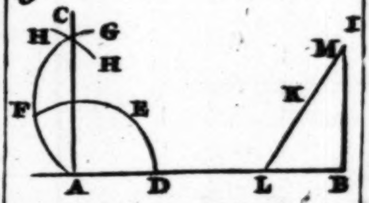

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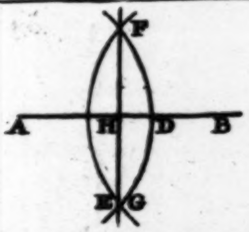

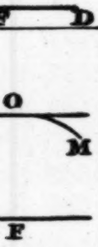

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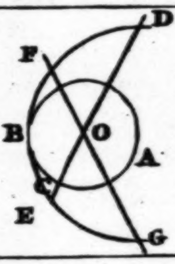

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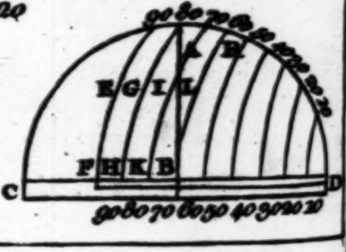


The Dimenſions of Wainſcoting and Paving, Plaiſtering, and Painting, are taken in Feet and Inches, and the Content given in Yards.

*Of the Square and ſuperficial Contents or Area.*

The ſquaring of any Number is multiplying it into itſelf, as 12 Inches multiplied by 12 Inches make 144 ſquare Inches. The ſuperficial Content or Area of any Thing is found four ſeveral Ways, *viz.* by whole Numbers, by Decimals, by Practice, and by croſs Multiplication; in each of which Methods I ſhall give Examples of Operation.

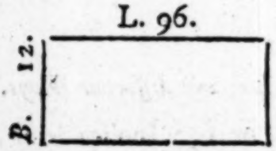
A Square hath its Sides perpendicular, and thoſe that are oppoſite equal; but the adjacent Sides are unequal: Boards, Wainſcots, Ceilings, Windows, Doors, *&c.* are commonly of this Figure.

When any Thing is to be meaſured, it muſt be conſidered what Form or Faſhion it is of; and then it muſt be meaſured according to the ſeveral Rules for each Figure.

*Firſt.* If it be a Square or Oblong, then the Length and Breadth muſt be multiplied one by the other, which gives the Content in ſquare Meaſure, and that Product muſt be divided by its proper Diviſor, according to the Name in which the Content or Area is to be given.

*Example.*

Admit a Board be 12 Inches broad, and 8 Feet or 96 Inches long, how many ſquare, or ſuperficial Feet doth it contain?



96
12

144)1152(8 Feet.
1152

(0)

Here the Length in Inches is multiplied by the Breadth in Inches, and the Product 1152 divided by 144, the ſquare Inches in a Foot, quotes 8 Feet ſquare for the Content of the Board.

### *A Rule for Diſpatch.*

If the Length of a Board, or Piece of Glaſs, be given in Feet, and the Breadth in Inches, multiply one by the other, (without any Reduction) and divide the Product by 12; and the Quotient will be the Anſwer in Feet, and the Remainder will be Parts of a Foot. So the foregoing Example might have been done ſooner by dividing 96 the Length by 12 the Breadth, and it quotes 8 Feet for the Content, by the former Way.

### *Example.*

Suppoſe a Board be 14 Inches long, and 15 Inches broad, what is the Content in ſquare Feet?

14 Feet long.
15 Inches broad.

12)210

Feet 17 $\frac{6}{12}$ or $\frac{1}{2}$

So the Anſwer is 17 Feet and $\frac{1}{2}$. And ſo for any other Example of this Kind.

*Or conciſer thus:*

14
by 1—3

14
3 In $\frac{1}{4}$ 3 $\frac{2}{4}$ or $\frac{1}{2}$

*Anſwer* 17 $\frac{1}{2}$

Here 3 Inches is the $\frac{1}{4}$ of a Foot, wherefore $\frac{1}{4}$ of 14 is taken and added to 14, and it makes 17 Feet, and $\frac{2}{4}$ equal to $\frac{1}{2}$.

### *Another Example worked four different Ways.*

If a Board be 12 Feet $\frac{1}{2}$, or 150 Inches long, and 15 Inches broad, how many ſquare Feet doth it contain?

| VULGARLY. | DECIMALLY. |
|---|---|
| *Inches,* | 12,5 |
| 150 long. | 1,25 |
| 15 broad. | |
| | 625 |
| 750 | 250 |
| 150 | 125 |
| 2250 | Feet, 15,625 |

144)

| | |
|---|---|
| 144)2250(15 Feet | Feet 15,625 |
| 144 | 12 |
| 810 | Inches 7,500 |
| 720 | 4 |
| Rem. 90 | Quarters 2,000 |

Multiply by 12 Inch. 1 Foot

144)1080(7 Inches.
1008

Rem. ..72
Multiply by 4 the Quarters in an Inch.

144)288(2 Quarters or ½
288

...

**By Croſs Multiplication.**

| | *Feet.* | *In.* |
|---|---|---|
| | 12 | 6 |
| | 1 | 3 |
| | 12 | 0 |
| | 0 | 6 |
| | 3 | 0 |
| | 0 | 1½ |
| *Anſwer* | 15 | 7½ |

**By Practice.**

| | *Feet.* | *In.* |
|---|---|---|
| | 12 | 6 |
| | 1 | 3 |
| | 12 | 6 |
| 3 Inches ¼ | 3 | 1½ |
| | 15 | 7½ |

The four Methods here uſed are as follow: Firſt, by multiplying the Inches together, and dividing by 144, &c. The ſecond Work is performed decimally; the third Method is by Croſs Multiplication; and the laſt and beſt is by Practice.

Any of theſe Methods may be eaſily underſtood by the Uſe of the arithmetical Part of this Book, except the Method by Croſs Multiplication, which I ſhall explain here.

In the Example, 1 Foot 3, ſtands under 12 Feet 6; and having drawn a Line, ſay, once 12 is 12, and then I ſay croſs-way, 6 Times 1 is 6 Inches; ſo that Line is 0 Feet 6 Inches: Then croſs-way again, I ſay 3 Times 12 is 36

Inches, the 12's in 36 is three Times, or 3 Feet; ſo that Line is 3 Feet 0 Inches. Laſtly I multiply the Inches together, ſaying, 3 Times 6 is 18, the 12's in 18 once, and there remains 6, or $\frac{6}{12}$, equal to $\frac{1}{2}$, as in the Work.

If a Board be Wider at one End than the other, then take the Breadth in the Middle, or add the Meaſure of both Ends together, and take the Half of the main Breadth, which multiply by the Length.

*Example.*

Suppoſe a Board to be 120 Inches long, and the narroweſt End 10 Inches wide, the Broadeſt End 34 Inches wide; what is its Content in ſuperficial Feet.

Add { 34 broadeſt End.
{ 10 narroweſt.

Sum 44
its Half
is 22 the Medium
120 the Length

144)2640(18 Feet $\frac{1}{3}$ *Anſwer.*
144

1200
1152

Rem. 48 | 4 | 1 or 4 Inches; that is 48 the Remainder
144 | 12 | 3 is $\frac{1}{3}$ of 144.

*Or thus:*

| | | *Feet.* | *Inches.* |
|---|---|---|---|
| | | 10 | 0 the Length. |
| | | 1 | 10 the main Breadth. |
| | In. | 10 | 0 |
| For 10 In. | $6\frac{1}{2}$ | 5 | 0 |
| | $4\frac{1}{3}$ | 3 | 4 |
| | | 18 | 4 *Anſwer.* |

If a Board or Piece of Glaſs be ever ſo irregular, it may be meaſured very near, by taking the Breadth in 5 or 6 Places, and add the ſeveral Breadths together, dividing the

Total by the Number of Places, and the Quotient will be the main Breadth; which multiply by the Length, &c.

Having the Breadth in Inches of any Board, or Piece of Glaſs, to know how much the Length of that Board or Piece of Glaſs will make a Foot ſuperficial.

*Rule.* Divide 144 by the Inches in Breadth, and the Quotient will be the Length of that Board that will make a Foot.

*Example.*

If a Board be 9 Inches broad, what Length of that Board will make a ſuperficial Foot?

9) 144

*Anſwer* 16

*Proper Dimenſions for Joiners, Painters, Glaziers, &c.*

Rooms being various in their Forms, take this general Rule in all Caſes, *viz.*

Take a Line, and apply one End of it to any Corner of the Room; then meaſure the Room, going into every Corner with the Line, till you come to the Place where you firſt began; then ſee how many Feet and Inches the String contains, and ſet it down for the Compaſs or Round; then take the Height by the ſame Method.

Glaziers are to take the Depth and Breadth of their Work, and multiply one by the other, dividing by 144; Glaſs being meaſured as Board.

Having thus ſhewn the Methods of caſting up Dimenſions, I come now to Particulars; and firſt of

*Glaziers Work by the Foot.*

If the Windows be ſquare, multiply the Length by the Breadth, which will produce the Content, as aboveſaid.

*Example.*

| By Croſs Multiplication. | By Practice. |
|---|---|
| *Feet. In.* | *Feet. In.* |
| 8—9 high | 8 — 9 |
| 7—3 broad | 7 Feet 3 |
| 56—0 | 61 — 3 |
| 2—0 | 3 Inches ¼ 2 — 2¼ |
| 5—3 | |
| 2¼ | 63 — 5¼ *Anſ.* |
| 63—5¼ | |

If the Windows are arched, or have a curved Form, no Allowance is made, by reaſon of the extraordinary Trouble, and Waſte of Time, Expence, or Waſte of Glaſs, &c. And the Dimenſions taken from the higheſt Part of the Arch, down to the Bottom of the Window, from the Height or Length; which multiply by the Breadth, and the Product will be the Anſwer in Feet, &c.

Glaziers are often ſo very nice, as to take their Dimenſions, and to meaſure to a Quarter of an Inch.

*Example.*

```
                              Feet.  In.
                               4 —— 3½ long.
                               2 —— 7¾ broad.
                              ─────────────
6 Inches is ½                  8 —— 7
     1½ is ⅛                   2 —— 1¾
      ¼ is ⅙                        6¼ ¾
                                    1  ¼
                              ─────────────
                              11 —— 4¼
                              ─────────────
```

Glaſs is meaſured by the Foot, and the Price of it is as follows, *viz.*

| | s. | d. |
|---|---|---|
| Beſt London Crown in Saſh Squares - - | 1 | 8 |
| Second ditto - - - - - | 1 | 6 |
| Beſt Newcaſtle Crown - - - - | 1 | 6 |
| Second ditto - - - - - | 1 | 4 |
| Inferior ditto in Skylights - - - | 1 | 2 |

## *Painters Work by the Yard.*

WHEN the Wainſcot of a Room is painted, you are to meaſure round the Room with a Line, as hinted before, and the Height is to be taken by girting a String over all the Mouldings from the Top of the Cornice to the Floor: then multiply the Compaſs by the Height, and you have the Content in Feet and Inches; which may be reduced into ſquare Yards, by dividing by 9.

*Example.*

*Example* I.

A Room painted,
*Feet.* *In.*
Being 45 — 8 in Compaſs What is the Content in
10 F. 6 high, ſquare Yards?

456 — 8
22 — 10

9)479 — 6

Yards 53 — 2 — 6 *Anſwer.*

*Example.*

If the Height of the Room painted be 12 Feet 4, and the Compaſs 84 Feet 11; what ſquare Yards doth it contain? Anſwer, 116 Yards 3 Feet $3\frac{2}{3}$.

*Feet.* *In.*
84 — 11 Compaſs
12 F. 4 high

In 1019 — 0
$4\frac{1}{3}$ 28 — $3\frac{2}{3}$

9) 1047 — $3\frac{2}{3}$

Yards 116 3 $3\frac{2}{3}$

*Note.* Double Work is allowed in Window Shutters; Saſh Frames and Mantlepieces are reckoned by themſelves, unleſs the Mantlepieces ſtand in the Wainſcot, and then they are to be meaſured as plain Work, deducting nothing for the Vacancy.

## Painting Common Colours.

*Prices.*

| | *s.* | *d.* |
|---|---|---|
| Clearcole and once in Oil - - | 0 | $3\frac{1}{2}$ to 4*d.* |
| ——— Twice in Oil - - - | 0 | $4\frac{1}{2}$ to 5*d.* |
| ——— Three Times in Oil - | 0 | 7 |
| ——— Three Times in Oil Green Olive | 0 | 11 |
| Saſh Frames twice in Oil, each - | 0 | 10 to 1*s.* |
| ——— Three Times, each - | 1 | 0 to 1*s.* 2*d* |
| Water-trunk, Gutters, &c. *per* foot running | 0 | 2 |
| Four Times in Oil flatted dead White | 1 | 0 |
| Skirting *per* Foot running - - | 0 | 1 to 2*d.* |

### *Joiners Work.*

WAINSCOTING, the Dimenſions are taken as in Painting, *viz.* by meaſuring the Height and then the Compaſs; which multiply one into the other, dividing the Product by 9, and the Quotient is the Anſwer in ſquare Yards.

*Example.*

What is the Content of a Piece of Wainſcoting that is 9 Feet 3 long, and 6 Feet 6 broad?

*Feet. In.*

9—3

6 F. 6

55—6

6 Inch $\frac{1}{2}$ 4—7$\frac{1}{2}$

9)60—1$\frac{1}{2}$(6 Yds. $\frac{2}{3}$ *Anſ.*

54

6

The Length and Breadth being multiplied together, brings it into ſquare Feet; which divided by 9, (the ſquare Feet in a Yard) produces 6 Yards $\frac{2}{3}$ for the Anſwer.

*By Croſs Multiplication thus.*

*Feet. In.*

9—3

6—6

54—0

4—6

1—6

1$\frac{1}{2}$

60—1$\frac{1}{2}$ as before, which divide by 9, *&c.*

*Once more.*

There is a Room wainſcoted, the Compaſs of which is 47 Feet 3 Inches, and the Height 7 Feet 6 Inches: what is the Content in Yards ſquare? *Anſwer* 39 Yards $\frac{1}{3}$.

*Feet In.*

47—3 Compaſs.

7—6 the Height.

330—9

6 In. $\frac{1}{2}$ 23—7$\frac{1}{2}$

9)354—4$\frac{1}{2}$

*Anſ.* 39 Yds. $\frac{6}{9}$ or $\frac{1}{3}$

### *The Prices of Joiners Work.*

| | *l.* | *s.* | *d.* |
|---|---|---|---|
| Slit Deal wrought, 2 Sides, *per* Foot. | 0 | 0 | 4½ |
| ¾ Deal ditto | 0 | 0 | 5 |
| Inch Deal ditto | 0 | 0 | 6 |
| 1¼ Deal ditto | 0 | 0 | 7 |
| 1½ Deal ditto | 0 | 0 | 8 |
| 2 Inch Deal ditto | 0 | 0 | 9 |
| ¾ Deal Boards for Slating, *per* Square | 1 | 3 | 0 |
| ¾ wrought Weatherboarding | 1 | 12 | 0 |
| 1½ Deal Saſhes ovolo | 0 | 0 | 6½ |
| 2 Inch Deal ditto | 0 | 0 | 7½ |
| 1½ Wainſcot ovolo Saſhes | 0 | 0 | 9 |
| 2 Inch Ditto | 0 | 0 | 10 |
| 1¼ 2-pannel ſquare Door | 0 | 0 | 7½ |
| 1½ 4-pannel ditto | 0 | 0 | 9 |
| 2 Inch Deal 6-pannel moulded 2 Sides | 0 | 1 | 3 |
| 1½ ſquare framed Partition | 0 | 0 | 8½ |
| Inch Deal keyed dado | 0 | 0 | 6½ |
| Deal Mouldings *per* Foot ſuperficial | 0 | 1 | 3 |

### *Carpenters Work.*

ROOFING, Flooring, and Partitioning, the principal Carpentry in modern Buildings, are meaſured by the Square of 10 Feet each Way, that is 100 ſquare Feet.

For roofing, multiply the Depth and half Depth by the Front, or the Front and half Front by the Depth, and you will have the Contents, if the Roof is true Pitch.

The Dimenſions are taken in Feet and Inches.

*Example.*

How many Squares doth that Piece of Work contain that meaſures 199 Feet 10 Inches in Length, and 10 Feet 7 Inches in Height? *Anſw.* 21 Squares 14 Feet 10¼.

*Operation.*
*Feet In.*
199—10 long
10 F. 7 high

1998— 4
6½ 99—11
1⅛ 16— 7⅝

21,14—10⅝ *Anſ.* 21 Squares, 14 F, 10 In. ⅝.

The Diviſion is performed by pointing off two Places towards the Right-hand, and the Number on the Left are Squares, &c.

*Again.*

If a Floor be 49 Feet 7 Inches 4 Parts long, and 26 Feet 6 Inches broad, how many ſquare Feet?

*The Operation by Croſs Multiplication.*

| *Feet* | *In.* | *Parts.* |
|---|---|---|
| 49 | 7 | 4 |
| 26 | 6 | |
| 294 | 0 | 0 |
| 98 | 0 | 0 |
| 15 | 2 | 0 |
| 24 | 6 | 0 |
| | 3 | 6 |
| | 8 | 8 |
| | 0 | 2 |
| 13 \| 14 | 8 | 4 |

*Anſ.* 13 Sq. 14 F. 8 In. 4 Pts.

Note. *In meaſuring Roofing, no Deduction is made for Sky Lights, Chimney Shafts,* &c.

In meaſuring Flooring, from the Content of the whole Floor in Feet, take the Content of the Vacancy for the Stairs in Feet, and the Remainder is the true Content; which bring into Squares as before.

Note. *In Partitioning, you muſt meaſure the Doors, Door-caſes, and Windows by themſelves, and deduct their Content out of the Whole, except by Agreement they are included; and then you muſt mention in the written Agreement, Doors, Doorcaſes and Windows included.*

There are divers Sorts of Carpenters Work belonging to a Building, *viz.* Cornices, Guttering, Shelves, Dreſſers, &c. all which are meaſured by ſuperficial Meaſure. There are alſo Doors and Door-caſes, Lanthorn Lights with their Ornaments, Cellar-doors and Curbs, Columns and Pilaſters, all which are valued by the Piece, or the Foot ſuperficial.

*Carpenters Work is done at the following Prices.*

| | *s.* | *d.* |
|---|---|---|
| Cornices *per* Foot ſuperficial - - | 1 | 2 to 1*s.* 4*d.* |
| Whole Deal Guttering - - - | 0 | 7½ |
| 1¼ Deal Shelves - - - - | 0 | 7 |
| 1½ Deal Dreſſers - - - - | 0 | 9 |

| Doors. *See Joiner's Work.* | *l.* | *s.* | *d.* |
|---|---|---|---|
| Fir Door-caſes *per* Foot Cube - | 0 | 3 | 3 |
| 1¼ Deal proper ledged Door - | 0 | 0 | 9 |
| Oak Kirbs *per* Foot Cube - - | 0 | 4 | 9 |
| 1½ Deal Columns, *per* Foot ſuperficial | 0 | 2 | 2 |
| 1½ Deal Pilaſters - - - | 0 | 1 | 0 |
| Inch White folding Floor - - | 1 | 15 | 0 |
| 1¼ Yellow ditto - - - - | 2 | 8 | 0 to 50*s.* |
| 1¼ Yellow Batten ſtrait Joint Floor | 3 | 3 | 0 |
| Labour and Nails to ſingle framed Floors | 0 | 7 | 6 |
| ———————— Ditto with Girders | 0 | 9 | 6 |
| ———————— Ditto 4 Inch Partition | 0 | 5 | 6 |
| ———————— Common Shed Roofing | 0 | 5 | 6 |
| ———————— Kirb Roofing - | 0 | 8 | 6 |
| Rough Fir ſawed *per* Foot Cube, 2*s.* 3*d.* to | 0 | 2 | 8 |

Note, *Carpenters meaſure the Timber Frames of any Building* (*which they call the Carcaſe*) *by the Square of* 10 *ſuperficial Meaſure, or* 100 *ſquare Feet, as hinted before.*

### *Sawyers Work.*

IN this Place it may not be improper to ſay ſomething in relation to the Method uſed by *Sawyers* in meaſuring their Work. When they work by the Great (as they ſay) moſt commonly they meaſure their Work by the ſuperficial Foot; ſo there is no great Difficulty in taking the Dimenſions; for they account the Depth of the Kerfs for the Breadth, and the Length for the Length. The Dimenſions being thus taken in Feet, the Content of one Kerf ſuperficial may be found by multiplying the Length by the Breadth, and then having found the Number of Feet in one Kerf, multiply it by the Number of Kerfs of the ſame Dimenſions, and you will have the Number of Feet in them all.

*Note* 1ſt, When thus they have caſt up the whole Content of their Work in Feet, they are paid for it by the Hundred, that is, 100 Feet.

2*dly*, That if the Kerf be but ſix Inches or leſs in Depth, then they have a Cuſtom to be paid for Kerf and half, (as they expreſs it) *i. e.* for half ſo much more as it comes to by Meaſure; and the Reaſon they give for it is, that the Trouble is ſo much the more on account of often ſhifting or removing and new binding their Timber, and therefore they inſiſt on it as a cuſtomary Price.

*Prices*

### *Prices of Sawyers Work.*

| | *s.* | *d.* |
|---|---|---|
| 20 Feet Plank *per* Dozen - - | 6 | 0 |
| 12 Feet ditto - - - | 3 | 6 |
| 20 Feet Deal - - - | 5 | 0 |
| 12 Feet ditto - - - | 2 | 9 |
| 10 Feet ditto - - - | 2 | 4 |
| Pale Boards - - - | 1 | 6 |
| 20 Feet Battens - - - | 3 | 6 |
| 12 Feet ditto - - - | 2 | 0 |
| 10 Feet ditto - - - | 1 | 9 |
| Fir Timber *per* Load of 50 Feet, allowing 4 cuts in it - - - | 6 | 0 |
| Engliſh Oak *per* Hundred Feet - | 5 | 0 |
| Clapboard *per* Hundred - - | 4 | 6 |
| Mahogany *per* Hundred - - | 5 | 6 to 8*s.* 4*d.* |

### *Bricklayers and Tylers Work.*

#### *Of Walling.*

WALLING is meaſured by the Rod Statute-meaſure, being 272 Feet and ¼ ſuperficial. The Method of taking their Dimenſions is thus: for a Wall round an Orchard or the like, they meaſure the Length by a Line going over the Buttreſſes; and for the Height they meaſure over the Mouldings (preſſing the Line into them) even to the Middle of the Coping: they likewiſe take Notice of the Thickneſs of the Wall, that is, how many half Bricks in Length the Wall is in Thickneſs; for three half Bricks, that is a Brick in Length, and one in Breadth, is Standard Thickneſs; and all Walls, whether leſs or more, muſt be reduced to that Thickneſs, by this Rule, *viz.* multiply the Product of the Length and Height, by the Number of half Bricks that the Wall is in Thickneſs; which Product divide by 3, and then the Quotient by 272 (the ¼ being generally neglected in Vulgar Working) and the Quotient will be Rods, at a Brick and a half thick, Standard Meaſure.

*Example.*

Admit the Face of the Wall to meaſure 4085 Feet, and the Thickneſs be two Bricks and a half, or 5 half Bricks thick, how many Rods doth it contain?

4085
5
3)20425
272) 6808(25 Rod, *Anſwer.*
1368
(8)

When the Work is wrought decimally, then you divide by 272¼, or 272,25, which gives the Quotient ſomewhat leſs. But the meaſuring of Brick Work may be ſhortened by having the Rod of 16 Feet ½ centeſimally divided into 100 equal Parts, with which you take the Dimenſions, and the Length of the Wall in thoſe Rods; and 100 Parts multiplied by the Height, give the Content in Rods, of any Wall that is a Brick and a half thick. Deduction muſt be made for Doors, Windows, &c.

A Table to reduce Brick Work to Standard-meaſure, *i. e.* a Brick and a half thick.

| *Brick.* | | | |
|---|---|---|---|
| 1 | Subtract | ⅓ | Reduces to a Brick and ½ |
| 2 | Add | ⅓ | |
| 3 | Multiply by | 2 | |
| 4½ | | 3 | |
| 6 | | 4 | |

*Example.*

Suppoſe a Garden Wall to be 254 Feet round, and 12 Feet 7 Inches high, and three Bricks thick; how many Rods doth it contain?

254
12
In. 3048
6½ 127
1⅙ 21—2
3196—2
2
272)6392—4(23, &c.

In this Operation, the Aggregate, or Total, is multiplied by 2, becauſe twice 3 is 6, the Number of half Bricks; and that reduces the Work to Standard meaſure, as by the Table above.

Of

### *Of Chimnies.*

This Brick-work is commonly agreed for by the Hearth, and alſo ſometimes by the Rod; and the Method of taking Dimenſions is thus: If the Chimney ſtands ſingly, not leaning againſt, or being in a Wall, and worked upright over the Mantle-tree to the next Floor, it is girt about the Breaſt for the Length, and the Height of the Story is taken for the Breadth, and the Thickneſs of the Jaumbs for the Thickneſs. But if the Chimney ſtands againſt, or in a Wall, which is before meaſured with the reſt of the Building, then the Breadth of the Breaſt or Front, together with the Depth of the two Jaumbs, is the Length; the Height of the Story the Breadth, and the Thickneſs of the Jaumbs the Thickneſs. But if the Chimney ſtands in the Corner of a Room, and has no Jaumbs, then the Breadth of the Breaſt is the Breadth, the Height of the Story the Length, and the Thickneſs the Thickneſs. And for the Shaft, it is commonly girt in the ſmalleſt Part for the Length, and the Thickneſs of both Sides, for the Thickneſs; in Conſideration of the Widths, Pargetting, Scaffolding, &c.

Note. *There is nothing to be deducted for the Vacancy between the Hearth and the Mantle-tree, becauſe of the Width and the Thickening for the next Hearth above.*

### *Gable Ends.*

Take half the Perpendicular for the Breadth, and the Width of the Houſe for the Length, or half the Width of the Houſe for the Breadth, and the Perpendicular for the Length, which brings the Meaſure to an Oblong, the Content of which is found by multiplying the Length by the Breadth, &c.

Note. *There are ſeveral other Things in Bricklayers-work, as Cornice, Facias, Straight Arches, Scheme Arches, Hips and Valleys in Tiling, and Water-courſes: All which are meaſured by the Foot. Alſo Piers, Pilaſters, Ruſtic Work,* &c. *which are valued by the Piece.*

### *Prices.*

| | *l.* | *s.* | *d.* |
|---|---|---|---|
| Brick-work all Grey Stocks, in Walling, &c. *per* Rod - - | 11 | 0 | 0 |
| Labour and Mortar only - - | 3 | 10 | 0 |
| Grey Stocks *per* Thouſand - | 1 | 16 | 0 to 38*s.* |

Plain

| | *l.* | *s.* | *d.* |
|---|---|---|---|
| Plain Tiles *per* Thouſand - - | 1 | 17 | 0 to 2*l.* |
| Pantiles *per* 100 - - - | 0 | 13 | 0 to 15*s.* |
| 2d Malm Stock facing - - | 0 | 0 | $2\frac{1}{2}$ to 3*d.* |
| Bricklayers *per* Day, from 25th March, to 9th Nov. - - | 0 | 3 | 10 |
| Ditto——— from 9th Nov. to 25th March - - | 0 | 3 | 6 |
| Labourers *per* Day, from 25th March, to 9th Nov. - - | 0 | 2 | 8 |
| Ditto——— from 9th Nov. to 25th March - - | 0 | 2 | 6 |
| Mortar *per* Hod - - | 0 | 0 | 6 |
| New plain tiling *per* Square, including all Materials - - | 1 | 14 | 0 |
| Grey gauged Arches - | 0 | 2 | 2 |

### *Paving.*

Pavement for Cellars, Waſh-houſes, *&c.* is meaſured by the Square Yard.

*Example.* If a Cellar, Waſh-houſe, or Court-yard, be paved with Bricks, or pitched with Pebble, being 9 Yards 2 Feet long, and 6 Yards 2 Feet broad; how many Yards ſquare doth it contain? *Anſwer,* 64 Yards 1 and ⅓ Feet, as by the following Work,

| | *Yds.* | *F.* | *Yds.* | *F.* | |
|---|---|---|---|---|---|
| | 9 | 2 | 9 | 2 | |
| | 6 | 2 | 6 | Yards 2 | |
| | 54 | 0 | 57 | 0 | |
| | 6 | 0 | 3 | 0 | 8 |
| | 4 | 0 | 3 | 0 | 8 |
| *Feet.* | | $1\frac{1}{3}$ | | | |
| 29 | | | | | |
| 20 | 64 | $1\frac{1}{3}$ *Anſ.* | 64 | 1 | $\frac{1}{3}$ |
| 9)580 | | | | | |
| Yds. $64\frac{4}{9}$ | | | | | |

Here the Anſwer is found by three different Operations, and the Reſult of each is the ſame.

### *Slating*

Is valued by the Square of 100 Feet; in ſome Places by the Rod of 18 Feet ſquare; that is 36 ſquare Yards, or 324 Feet.

☞ In Tiling and Slating, where there are Gutters and

Valleys, there is commonly an Allowance which is to take the Length of the Roof all along upon the Ridge, which makes the Gutter double Meaſure; which in ſome Places is allowed, in others not. Sometimes there is an Addition for hollow Ware, that is Ridge-tiles, Gutter-tiles, Corner and Dormar-tiles; and here Cuſtoms differ. For in ſome Places they account one ſuperficial Foot for every lineal Foot or running Meaſure; then 100 Feet lineal is reckoned a Square. In other Places, for every 100 of ſuch Tiles they reckon one Square.

*Prices of Slating in* London, *1ſt Sept.* 1798.

| Welch Slating, *viz.* | *l.* | *s.* | *d.* |
|---|---|---|---|
| Common double Welch Slating, *per* Square of 100 feet | 1 | 10 | 0 |
| Ladies Ditto | 1 | 12 | 0 |
| Counteſs ditto | 1 | 16 | 0 |
| Dutcheſs ditto | 2 | 2 | 0 |
| Welch Rags | 2 | 5 | 0 |
| Patent Slating, *per* Square | 2 | 15 | 0 |
| Weſtmoreland Slating, with Iron Nails | 3 | 0 | 0 |
| Ditto with Copper Nails | 3 | 3 | 0 |
| Taviſtock Slating | 1 | 14 | 0 |
| Labour and Materials, ripping old Slating, and new laying complete, *per* Square. | 0 | 16 | 8 |

### *Plaiſtering*

Is of two Kinds, *viz. Firſt*, Work lathed and plaſtered, ſometimes called Ceiling. *Secondly*, Plaiſtering upon Brick-work, or between the Quarters in Partitioning, by ſome called Rendering; both which are meaſured by the Yard ſquare, as the Joiners and Painters do. In taking Dimenſions of Ceiling, if the Room be wainſcoted, they conſider how far the Cornice bears into the Room, by putting up a Stick perpendicular to the Ceiling, cloſe to the Edge of the uppermoſt Part of the Cornice; and meaſure the Diſtance from the perpendicular Stick to the Wainſcot; twice which Diſtance muſt be deducted from the Length and Breadth of the Room taken upon the Floor, and the Remainder is the true Length and Breadth of the Ceiling. As ſuppoſe a Floor is 24 Feet long, and 18 Feet broad; and the Cornice ſhoots out 6 Inches; deduct a Foot for both Ends, and the Length of the Ceiling is 23 Feet; and the ſame for the Breadth; it leaves 17 Feet broad; which multiplied together, gives the Content, 391 Feet; or 43 Yards and a half.

*Example.*

23 Feet the Length.
17 Feet broad.

161
23

9)391(43 Yards, 4 Feet.
36

31
27

4

If the Ceiling of a Room be 19 Feet 10 one Way, and 17 Feet 6 the other, how many ſquare Yards doth it contain?

By Croſs Multiplication, thus:

19 : 10
17 : 6

133
19
14 : 2
9 : 6
5

9)347 : (38 Yds. 5 Ft. 1 In.

How many Yards ſquare are there in a Piece of Plaiſtering that is 47 Feet 4 Inches 7 Parts long and 18 Feet broad?

*F. I. Pts.*
47—4—7
3 times 6 is 18

142—1—9
6

9)852-10—6(94 Yds. 6 Feet, 10 Inches, 6 Parts.

The

| *The Prices.* | *l.* | *s.* | *d.* |
|---|---|---|---|
| Render 1 Coat and Sett, *per* Yd. | 0 | 0 | 6 |
| Ditto——————Floated | 0 | 0 | 8 |
| Lath Plaiſter ſett | 0 | 1 | 0 |
| Ditto——————Floated | 0 | 1 | 4 |
| Waſh, Stop and White | 0 | 0 | 2 |
| Straw Colouring | 0 | 0 | 4½ |
| Lime Whiting *per* Yd. | 0 | 0 | 2 |
| Plain Cornice, *per* Foot ſuperficial | 0 | 1 | 4 |
| Plaiſterer *per* Day | 0 | 3 | 10 |
| Labourer—————— | 0 | 2 | 9 |
| Boy—————— | 0 | 1 | 8 |
| A Bundle Laths and Nails | 0 | 2 | 9 |
| Lime and Hair, *per* Hod, | 0 | 0 | 10 |
| Fine Stuff———Ditto | 0 | 1 | 2 |

### *Maſons Work.*

THE Maſons Work, conſiſting of Stone, is of two Sorts, *viz.* Superficial and Solid. Pavements and the Face of Stone Walls, Houſes, *&c.* are meaſured as Brick-work. If the Work have Ornaments, as Capitals, Pilaſters, Rails, and Balluſters, *&c.* then they are valued by the Piece.

| *Prices.* | *s.* | *d.* |
|---|---|---|
| Portland Stone, *per* Foot Cube | 3 | 4 |
| Plain Work, ſuper. | 0 | 10 |
| Sunk or moulded Ditto | 1 | 0 |
| Portland Chimney Pieces *per* Foot ſuper. | 1 | 9 |
| Fire-ſtone, Hearths, and Covings, *per* Foot ſuper. | 1 | 1 |
| Vein Marble Chimney Pieces, ſet complete 6*s* 6*d*. to | 7 | 6 |
| Purbeck paving in Courſes, *per* Foot ſuper. | 1 | 1 |
| Purbeck Steps, *per* Foot running | 2 | 9 |
| 14 Inch York coping, *per* Foot running | 1 | 8 |
| York Window Sills, *per* Foot running | 1 | 8 |
| Labour and Gravel, to pebble Paving, *per* Yd. | 0 | 8 |
| Clinker Paving all materials, Ditto | 6 | 6 |
| New York Paving, *per* Foot | 0 | 11 |
| Old Paving relaid, *per* Foot | 0 | 2 |

Smith's Work is done by the *lb.*

| *the Price is as under.* | *d.* |
|---|---|
| Chimney bars, &c. | 4½ to 5 |
| All framed Work as Gates, &c. | 6 |
| Iron Bolts and Nutts, &c. | 7 |

| *Plumber's Prices as under.* | *l.* | *s.* | *d.* |
|---|---|---|---|
| Sheet Lead, *per* Cw. | 1 | 3 | 0 |
| Milled Lead——— | 1 | 4 | 0 |

| | | | |
|---|---|---|---|
| 3½ Rain Pipes, *per* Foot | 0 | 2 | 8 |
| ¼ Ditto——— *per* Foot | 0 | 0 | 10 |
| ¼ Joints of Solder | 0 | 2 | 0 |
| 1¼ Joints ——— | 0 | 3 | 0 |
| 1¼ Pipe——— | 0 | 1 | 8 |
| Solder *per* lb. | 0 | 0 | 9 |
| Plumber *per* Day | 0 | 4 | 0 |

*Mem.* Plumbers allow for old Lead 4s. per Cwt. leſs than the Price of new caſt Lead; it is cuſtomary to deduct 2lb. per Cwt. for Dirt.

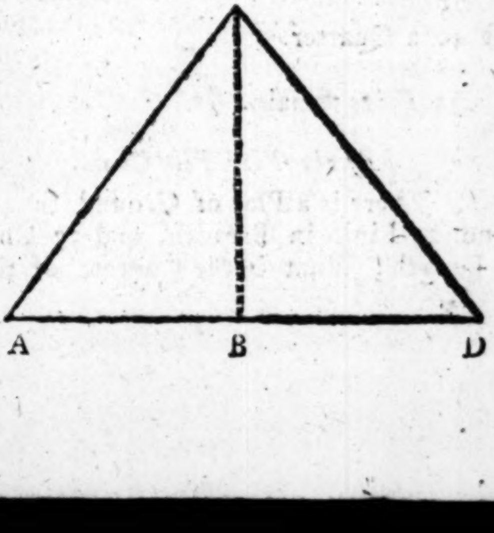
### *Land Meaſure.*

LAND is uſually meaſured by the Acre. The Dimenſions are taken with a Chain of four Poles in Length, which is divided into 100 Parts, called *Links*, and 10 ſquare Chains make an Acre. Let them be 10 in Length, and 1 in Breadth, or 5 in Length and 2 in Breadth, &c. or 160 ſquare Poles; but to find its Content (if not regularly ſquare) it is generally divided into Triangles: Thus a Piece of Land of 4 Sides (if not ſquare) may be divided into two Triangles, Pieces of 5 Sides into 3, and a 6-ſided Piece into 4 Triangles.

### *To meaſure a Triangle.*

Admit the longeſt Side of the following Triangle, *viz.* A D to be 76 Poles; and the perpendicular or dotted Line B C to be 30 Poles; multiply 76 (the Baſe) by 15, the Half of the Perpendicular B C, and it produces 1140: Or you may multiply the whole Perpendicular by Half the Baſe (or longeſt Side) it will produce the ſame; which divided by 160, (the ſquare Poles in an Acre) the Quotient gives the Content of that Piece of Land in Acres; and what remains multiply by 4, and divide by the ſame Diviſor, and it quotes Roods, &c.

Note, *Always the Perpendicular is drawn from the oppoſite Angle to the Baſe, or longeſt Side, as in the following Figure.*



*The Operation.*

76 The Baſe.
15 Half the Perpendicular.

16 | 0)114 | 0(7 Acres $\frac{2}{16}$ $\frac{1}{8}$
112

2

All other Pieces of Land (for the moſt part) muſt b divided into Triangles, and when meaſured, their Contents added together.

Suppoſe an oblong Plat of Ground contains 35 Pole broad, and 185 Poles long, how many Acres is the Content

*Rule*, Multiply the Length in Poles by the Breadth and divide the Product by 160, (the ſquare Poles in a Acre) and the Quotient will be the Anſwer in Acres and if the Remainder

$$\text{Be}\left\{\begin{matrix}120\\80\\40\end{matrix}\right\}\text{its Value is}\left\{\begin{matrix}\frac{3}{4}\\\frac{1}{2}\\\frac{1}{4}\end{matrix}\right\}\text{of an Acre.}$$

*The Work.*

185 the Length.
35 the Breadth.

925
555

160)6475(40 Acres.
640

75
deduct 40 a Quarter.

35 Poles remain.

The Content 40 Acres, and 35 Poles; or almoſt 4 Acres and a half.

*By the Four Pole Chain.*

*Example*. There is a Plat of Ground that contains 1 Chains and 25 Links in Breadth, and 57 Chains and 3 Links in Length: What is the Content of that Piece o Land?

C. *Link.*
57,30 Length.
16,25 Breadth.

28650
11460
34380
5730

Ac. 93|11250 cut off 5 Places.
4

No Roods ,45000
40

Poles 18 | 00000 93 A. 0 R. 18 P. *Anſ.*

*Note,* 4 Roods or Rods is 1 Acre, 40 Poles 1 Rood or Rod, ſo that one Rood or Rod is a Quarter of an Acre.

*Note alſo,* That the above Chain, commonly called *Gunter's* Chain, contains 4 Statute Poles in 100 Links, ſo that any Number of Chains are no more than ſo many 100 Links, as 4 Chains are 400 Links, and 6 Chains 600 Links, &c. 160 Statute Poles are an Acre, each Pole being 16 Feet and an half; therefore, in a ſquare Chain there are 16 ſquare Poles; and if you divide 160, the ſquare Poles in an Acre, by 16, the ſquare Poles in a Chain, the Quotient is 10, the ſquare Chains in an Acre.

A ſquare Chain contains 10,000 ſquare Links (or 100 multiplied by 100, and therefore it follows, that an Acre contains 100,000 ſquare Links.

### *To reduce Statute to Cuſtomary Meaſure.*

According to the Statute made in the 33d of *Edward* the Firſt, and another in the 25th of Queen *Elizabeth*, a Statute Pole is 16 Feet and a half long, (as ſaid before) but in divers Parts of *England* there are uſed Poles of 18, others of 21, and ſome of 24 Feet long, called Cuſtomary Meaſure, being in Uſe according to the Humour or Cuſtom of the Place where they are taken. To turn therefore one Sort of Meaſure into the other, admit Statute Meaſure to be turned into Cuſtomary, do thus: Multiply the Number of Acres, Roods, and Poles, Statute Meaſure, by the ſquare half Yards, or ſquare half Feet in a ſquare Pole of Statute

Meaſure, and divide the Product by the ſquare half Yards, or ſquare half Feet contained in the Pole of the Meaſure Cuſtomary, and the Quotient gives the Anſwer in the latter, in Acres, &c.

*Example.* In 172 Acres Statute Meaſure, how many Acres of 18 Feet to the Pole or Perch?

172 Statute Meaſure.
121 Square half Yards.

144)20812(144 Acres $\frac{76}{144}$ *Cuſtomary Meaſure.*

In a Statute Pole are 11 half Yards, which ſquared, make 121 ſquare half Yards; and in a ſquare Pole of 18 Feet, are 144 ſquare half Yards, &c. For the Remainder, work as before, *viz.* by multiplying it by 4, &c. and the next Remainder by 40, &c. as ſpoke to before: So that the Anſwer is, that 172 Acres Statute Meaſure, make 144 Acres 2 Roods, and 4 Poles of ſuch Cuſtomary Meaſure.

*An Example to the Contrary.*

In 543 Cuſtomary Acres of 18 Feet to the Pole, how many Acres of Statute Meaſure, being 16 Feet and a half to the Pole?

543 Cuſtomary.
144 Square half Yards in a Cuſtomary Acre.

2172
2172
543

121)78192(646 Statute Acres.
726

55, &c.

The Remainder 26 multiplied by 4 produces 104, which not amounting to a Rood, ſhould be multiplied by 40, their Product is 4160; which divided by 121, quotes 34 Perches, and 46 remains. So the Anſwer is, that 543 Cuſtomary Acres, of 18 Feet to the Pole, make 646 Acres 34 Poles, and $\frac{46}{121}$ of a Pole.

*Note.* Cuſtomary Acres, as well as Statute Acres, contain 100 ſquare Poles or Perches; the Exceſs of Bigneſs is by the Bigneſs of the Pole.

*Solid*

### *Solid Meaſure*

IS that of Timber, Stone, Digging, Liquids, &c. and e Rule for Working is to multiply the Length, taken Inches, and the Breadth together, and then that Product, the Depth or Thickneſs, and the laſt Product will be e Content in Cubic Inches, which if Timber or Stone, vide by 1728, (the Cubic Inches in a ſolid Foot) and e Quotient gives the Content in ſolid Feet.

*Example.* If a Tree be 16 Feet long, and 18 Inches uare; how many ſolid Feet doth it contain?

ultip. { 18 × 18 ; 16 × 12

324

192 the Length in Inches.
324 Breadth and Thickneſs.

768
384
576

1728)62208(36 Feet.
5184
10368
10368
0

Decimally

are. 1,5
1,5
2,25 Breadth.
16 Length.
36,00 *Anſwer.*

By Practice.

1 6
1 6
1 6
6 In ½ 9
2 3
4 times 4 is 16
9
Feet 36 0 Anſwer.

Solid Meaſure.

40 Feet of round } Timber is a Ton or Load.
50 —— of hewn }
1728 Inches is a Foot of Stone or Timber.
27 Feet is a Yard.
282 Inches is a Gallon of Ale or Beer.
231 Inches is a Gallon of Wine.

Suppoſe there is given an oblong Piece of Timbe whoſe Breadth is 2,25, and Thickneſs 1,64 Feet, an Length 36,5 Feet, how many ſolid Feet are containe therein?

```
    2,25 Breadth.
    1,64 Thickneſs.
  ------
     900
   1350
   225
  ------
   36900
    36,5 Length.
  ------
  184500
 221400
110700
 -------
134,68500  Anſwer, 134,685 ſolid Feet, or 134,
           nearly.
```

### *Of Timber Meaſure.*

WHEN at any Time you would know the Content any Piece of Timber by Vulgar or Decimal Arithmet obſerve what follows, *viz.* The Tree being girted, a one fourth Part taken for the Side of the Square, m tiply the Length of the Side of the Square in Inc into itſelf, and that Product by the Length in Fe which laſt Product divide by 144: But if you multiply the Length in Inches, then your Diviſor muſt be 17 and if any Thing remains, divide ſuch Remainder by and the Quotient will be the odd Inches.

*Example.*

Suppoſe a Piece of Timber 15 Feet long, and a Quarter of the Girt 42 Inches; what is the Content of that Piece?

*The Work.*

42 Inches in the Side of the Square.
42

84
168

1764
15 Feet in Length.

*F. I.*
144)26460(183 9 *Anſwer.*
144

1206
1152

540
432

12)108(9 Inches.

(0)

*Note.* In this Example 1764 is multiplied by 15 in one Line. But the foregoing Example may be worked ſhorter by Decimals, thus:

Squared $\left\{\begin{array}{l}3,5\\3,5\end{array}\right.$ the Side of the Square 42 Inches.

175
105

12,25 the Product are Feet.
15 Feet the Length.

6125
1225

183,75 the Cont. *viz.* 183, $\frac{75}{100}$ or $\frac{3}{4}$ as before.

But this common Way of taking $\frac{1}{4}$ of the Compaſs for the Side of the Square, which is equal to the Content of the

Circle

Circle in round Timber is erroneous, and gives the Solidit ſomewhat leſs than the true Content; but the true Way to multiply half the Diameter to half the Compaſs, an then that Product multiply by the Length, which divid by 1728, and the Quotient is the Content. If you canno come to meaſure the End of the Piece, you may know th Diameter by this Proportion, *viz.* as 22 is to 7, ſo is th Compaſs to the Diameter. Or you may find the Side of Square of a round Piece of Timber, by this Rule, *viz.* multiply 2821 by the Inches of the Compaſs, and cut off 4 Figures on the Right-hand of the Product.

2821
Inch. 66 the Compaſs.

16926
16926

18 | 6186 *An.* 18 $\frac{6}{10}$ In. nearly

Having the Breadth and Depth of a Piece of Timbe or Stone; to know how much in Length of it will mak a ſolid Foot; multiply one with the other, and let th Product be a Diviſor to 1728, thus:

24 broad.
18 thick.

192
24

432)1728(4 Inches in Length.
1728

Thus you may make a Table to ſerve all Breadths an Depths, by which much Labour may be ſaved, and y meaſure any Piece of Timber very exactly.

In Square Timber, you muſt make the Inches ſquared Diviſor to 1728, and the Quotient will be the Anſwer i Inches of Length, that will make a Foot ſolid.

*Example.*

If a Piece of Timber be 8 Inches ſquare, what Lengt of it will make a Foot?

64)1728(27
128

448
448

(0)

*Anſwer*, 27 Inches, o 2 Feet 3 Inches i Length.

Here the Square of 8 is 64, &c.

Again, Suppoſe a Piece be 18 Inches ſquare, what Length will make a Foot? *Anſw.* 5 Inches and one third.

The ſquare of 18 is 324)1728(5 $\frac{108}{324}$ equal to ⅓.
1620
———
(108)

The uſual Way of tapering Timber, is by this Method, *viz.* take the Dimenſions in the Middle, and multiply that by the Length; which is not accurate, but if the Dimenſions be taken in ſeveral Places, and the Means be uſed, the Content thus found will be near the Truth.

### *Digging*

IS meaſured by the ſolid Yard of 27 Feet; that is, 3 Times 3 is 9, and 3 Times 9 is 27, by which are meaſured Vaults or Cellars, Clay for Bricks, *&c.* Other Things are meaſured by the Floor of 324 ſolid Feet.

### *Example* 1.

If a Vault or Cellar be digged 9 Feet deep, 4 Feet ½ long, and 3 Feet 9 Inches broad; what is its Content in ſolid Yards?

*Feet.*
4½ long.
9 deep.
———
40½
3 F. 9 broad
———
121½
6 Inches ½ — 20¼
3 is ½ of 6 — 10
———
27)151¾(5 Yards, 16 Feet ¾
135
———
(16)

### *Example* 2.

How many Yards of Digging will there be in a Vault that is 25 F. 4 long, 15 F. 8 broad, and 7 F. $\frac{1}{2}$ deep.

25—4
3 times 5 is 15

76—0
5

380—0
4 F. is $\frac{1}{3}$ 8—5 $\frac{1}{3}$
4 F. is $\frac{1}{3}$ 8—5 $\frac{1}{3}$

396 10 $\frac{2}{3}$
7 $\frac{1}{2}$

2778—2 $\frac{2}{3}$
$\frac{1}{2}$ 198—5 $\frac{1}{3}$
*Yd.* *F.* *In.*
27)2976—8(110—6—8
27

6

### *Example* 3.

There is a Mote that is 648 Feet long, 24 Feet broad, and 9 Feet deep, how many Floors?

648 long.
24 broad.

2592
1296

15552
9

Divide by 324)139968(432 Floors. *Anſwer.*

&c.

(0)

Solid Bodies being frequently painted, it is neceſſary to know how to find the Superficiality: To find the ſuperficial Content of a Square, or many ſided, or round Pillar: Multiply the Sum of the Sides or Circumference, by the Height in Feet, and the Product, divided by 9, will be ſquare Yards.

### *Of a Globe.*

Multiply the Circumference in Feet by itſelf, and then that Product by this Decimal 0,0353678, and this laſt Product will be the Content in Yards.

To find the ſuperficial Content of a Pyramid or Cone, multiply half the Sum of the Sides, or half the Circumference of the Baſe, by the ſlant Height in Feet: and the Product divided by 9, will be ſquare Yards.

If the Pyramid or Cone be not complete, that is, if Part of the Top be wanting, add together the Circumferences at Top and Bottom, and half their Sum being multiplied by the ſlant Height, will be ſuperficial Content.

*Note*, A ſolid Yard ſquare of Clay will make about 7 or 800 Bricks; and the Price of making is 7 or 8*s.* a Thouſand: 3 Bags (or Buſhels) and half of Lime, and half a Load of Sand, will lay 1000 Bricks.

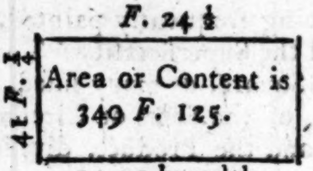
500 Bricks }
1000 Plain Tiles } make a Load.
25 Bags 1 *C.* of Lime. }

IT may not here be improper, as well for refreſhing the Memory, as for improving the Underſtanding and forming the Mind with proper Notions and Ideas of Meaſuring, to give a ſhort Repetition by demonſtrative geometrical Figures, to explain what had been verbally and arithmetically before expreſſed.

And firſt for *Planimetry*, or *ſuperficial*, or *flat Meaſure*: Some of which is meaſured by the Foot ſquare; as are Boards, Glaſs, Marble, Freeſtone, and Pavements. The Dimenſions are taken in Feet and Inches, and the Content given in ſquare Feet.

### *Example* 1.

Suppoſe there is an Oblong, or long Square, let it be Board, Glaſs or Pavement, &c. that contains on the longeſt Side (or the Length) 24 Feet and a half, and the ſhorteſt Side or Breadth, 14 Feet ½, as in the following Figure, *viz.*



14,25 breadth.<br>
24,5 length.

```
   7125
  5700
 2850
 ———
 349,125
```

*Rule.* Multiply the Length by the Breadth, and cut off as many Places to the Right-hand as there are Decimals in the Length and Breadth.

### *Example* 2.

Suppoſe a Board or Piece of Glaſs be in the Form of *Figure the Firſt,* called the Rhombus, that is in the Shape of a common Pane of Glaſs, or Diamond Square.

*Rule.* To meaſure which, multiply the Breadth *A. B.* by the Length of any of the Sides (for they all are equal) and cut off as many Places to the Right-hand as there are Decimal Places in both Multiplicand, and Multiplier, as hinted before. As ſuppoſe one Breadth *A. B.* 8 Feet 38 Parts, and the Length of the Side to be 8 Feet, 52 Parts, then the Work will appear thus:

```
  F.P.
  8,52
  8,38
  ———
  6816
 2556
6816
———
71,3976
```

Here the Multiplication is as in whole Numbers, and the Content or Anſwer is found to be 71 ſquare Feet, and $\frac{3976}{10000}$ of a Foot, or 4 Inches ¼.

3976 is ſeparated by a Comma, as above directed, and are ſo many 10,000 Parts of a Foot.

### *Example* 3.

Again, admit a Piece of Meaſurement to be in the Form of *Figure the Second,* called a Rhomboides; its Length 17 Feet 25 Parts, and its Breadth 8 Feet 58 Parts.

*F. P.*

The forementioned Figure hath its oppoſite Side equal, and its oppoſite Angles alike.

*F. P.*
17,25 length.
8,58 breadth.

13800
8625
13800

148,0050 *Anſwer*, the Content is 148 Feet.

*Once more.*

Suppoſe a Board, Piece of Glaſs, Pavement, or Piece of Land, to repreſent, or be in the Form of a Triangle, or three cornered Figure, expreſſed as in the Shape of *Figure the Third.* Every Triangle is half an Oblong, whoſe Length and Breadth is equal to the Perpendicular, and Baſe.

*Note*, the dotted Line is the Perpendicular, the bottom Line the Baſe, and the Line from the Top of the Perpendicular to the left Angle of the Baſe, is called the Hyponthenuſe.

The meaſuring of a Triangle hath already been ſhewn, and therefore I ſhall deſiſt ſpeaking any further thereto.

The *Fourth Figure* is called a Trapezium, and conſiſts of 4 Sides: This Figure before it can be meaſured, muſt be divided into two Triangles, thus; *viz.* by a Line drawn from one Angle or Corner, to the Angle oppoſite to it, as in the Figure.

*Example 4.*

Suppoſe the Dimenſions of the Trapezium before deſcribed to be, *viz.* the Baſe 16 *F.* 67; the one Perpendicular 12 *F.* 50, and the other 9 *F.* 68, (as in Figure 5) what is the Content?

*The Operation.*

One Perpendicular 12,50 } add
The other 9,68 }

The Sum is 22,18

The half Sum is 11,09 which
multiply the whole Baſe 16,67

produces 184,8703

which is 184 Feet, and $\frac{8703}{10000}$ of a Foot, equal to 10 Inches and a half.

*Note*, If two Sides of a Trapezium are parallel, that is, equi-diſtant, then add them together, and half the Sum multiplied by the neareſt diſtance between thoſe two Sides, gives the Content. Or if you meaſure in the Middle between two Sides or Lines that are of equal Length, the Anſwer will be the ſame.

*Note alſo*, The Painting, Plaiſtering, &c. of irregular Pieces, in the Forms of Triangles, or not, if divided as above, may be meaſured as before; and brought into Yards (if the Content is to be ſo given in) by dividing by 9, as before ſhewn.

## *Of Regular Figures.*

Figures that have more than 4 Sides are called Polygons, and thoſe of them that have their Sides and Angles equal called regular Polygons.

Regular Polygons have their Names from the Number of their Sides; thus a Figure having

| | | |
|---|---|---|
| 3 | Equal ſides, is called a | Trigon, or Equilateral Triangle. |
| 4 | | Tetragon, or Square. |
| 5 | | Pentagon. |
| 6 | | Hexagon. |
| 7 | | Heptagon. |
| 8 | | Octagon. |
| 9 | | Nonagon. |
| 10 | | Decagon. |
| 11 | | Undecagon. |
| 12 | | Dodecagon. |
| 13 | | Quindecagon. |

The Area of a Pentagon may be found by multiplying the Square of its Side by the Number 1,7204774. Thus if the Side of a Pentagon be 11 Feet, then the Square thereof will be 11 times 11, or 121 Feet.

Multiply 1,7204774
by 121

17204774
34409548
17204774

208,1777654

Therefore the Area of a Pentagon will be upwards of 208 ſquare Feet.

In like Manner, to find the Area of the

| | | |
|---|---|---|
| Trigon, | Multiply the Square of the Side by | 0,4330127 |
| Tetragon, | | 1,0000000 |
| Hexagon, | | 2,5980762 |
| Heptagon, | | 3,6339124 |
| Octagon, | | 4,8284271 |
| Nonagon, | | 6,1818242 |
| Decagon, | | 7,6942088 |
| Undecagon, | | 9,3656404 |
| Dodecagon, | | 11,1961524 |

## *Of a Circle.*

### *Figure the Ninth.*

A Circle is contained under one Line called the Circumference or Periphery; as *ABC*. All right Lines drawn from the Centre *E*, to the Circumference, are equal, and called Radiuſes, or half Diameters: And the long Line through the Centre from *A* to *C* is the Diameter.

To divide a Circle into 6 equal Parts, extend the Compaſſes to half the Diameter, as from *A* to the Centre *E*, and the Extent applied to the Circumference will divide it into thoſe Parts.

The Diameter *AC*. divides the Circle into two equal Parts, each of which is called a Semicircle; and if a Semicircle be divided into two equal Parts, thoſe Parts are called Quadrants.

The Queſtions relating to the meaſuring of the Circle and its Parts may be ſolved as follows:

1. The Diameter being given to find the Circumference.

*Rule*. Multiply the Number 3,141597 by the Diameter, and the Product will be the Circumference. *Note*. The Number 3,1416 will be exact enough in moſt Caſes.

*Example*. The Diameter of a Circle being 11 Inches, what is its Circumference?

3,1416

3,1416
11

---

3,1416
3,1416

---

*Anſwer,* 34,5576 (or above 34½) Inches.

2. The Diameter being given, to find the Area.

*Rule.* Multiply the Number 0,7853982 (or in Common Caſes 0,7854) by the Square of the Diameter, and the Product will be the Area.

*Example.* What is the Area of that Circle whoſe Diameter is 11 Inches?

11 times 11 is 121 0,7854
121

---

7854
15708
7854

---

*Anſwer,* 95,0334 Square Inches.

3. The Circumference being given, to find the Diameter.

*Rule.* Multiply the Number 0,3183099 (or in common 0,31831) by the Circumference, and the Product will be the Diameter.

*Example.* What is the Diameter of that circle, whoſe Circumference is 34½ Inches.

34½ —34,5 0,31831
34,5

---

159155
127324
95493

---

*Anſwer,* 10,981695 (or almoſt 11) Inches.

4. The Circumference of a Circle being given, to find its Area.

*Rule.* Multiply the Number 0,0795775 (or in common, 0,0796) by the Square of the Circumference, the Product will be the Area.

*Example.* What is the Area of a Circle, whoſe Circumference is 34½ Inches?

| | |
|---|---|
| 34,5 | 1190,25 |
| 34,5 | 0,0796 |
| 1725 | 714150 |
| 1380 | 1071225 |
| 1035 | 833175 |

1190,25 *Anſwer,* 94,743900 (or almoſt 95) ſquare Inches.

5. The Area of a Circle being given, to find its Diameter.

*Rule.* Multiply the ſquare Root of the Area by the Number 1,12837, and the Product will be the Diameter.

*Example.* What is the Diameter of that Circle whoſe Area is 95,0334 ſquare Inches?

| | |
|---|---|
| 95,0334(9,75 | 1,12837 |
| 81 | 9,75 |
| 187)1403 | 564185 |
| 1309 | 789859 |
| | 1015533 |
| 1945)9434 | |
| 9725 | 11,0016075 |

*Anſwer,* The Diameter is 11 Inches.

6. The Area of a Circle being given to find its Circumference.

*Rule.* Multiply the ſquare Root of the Area by the Number 3,5449, and the Product will be the Circumference.

*Example.* What is the Circumference of that Circle whoſe Area is 95,0334 ſquare Inches?

| | |
|---|---|
| 95,0334(9,75 | 3,5449 |
| | 9,75 |
| | 177245 |
| | 248143 |
| | 319041 |
| | 34,562775 |

*Anſwer,* The Circumference is 34½ Inches.

7. To meaſure the Sector of a Circle. See *Figure* 10

*Caſe the Firſt.* If the Length of the Arc *D E* and th Semidiameter *C E* be given.

*Rule.* Multiply the Length of the Arc by ½ the Semidiameter; and the Product will be the Area.

*Caſe the Second.* If the Number of Degrees containe in the Arc, and the Semidiameter be given.

*Rule.* Multiply the Squares of the Semidiameter by th Number of Degrees contained in the Arc, and that Product by the Number, 0,0087267, and the Reſult will b the Area required.

*Example.* Let the Arc conſiſt of 90 Degrees, or ¼ o the Circumference, and the Semidiameter be 3½.

```
  3,5          12,25          0,0087267
  3,5             90              11025
 -----        -------        -----------
  175        1102,50             436335
 105                            174534
 -----                         872670
12,25                         8,7267
                             -----------
                             9,62118675
```

## *Of Solid Meaſure.*

SOLID or Cube Meaſure hath been already defined, a well as ſuperficial Meaſure, ſome of the Figures of whic are numbered, 6, 7, and 8.

To meaſure a Solid in form of a Cube, which hat Length, Breadth, and Thickneſs all equal, you mu multiply theſe into themſelves; and the laſt Product give the Solidity or Contents, either of Wood or Stone. A Cube hath ſix ſides, and is in Shape like a Dye.

*Example.*

What is the Solidity of a Cube whoſe Side is 12 Inches?

```
  12
  12
 ----
 144
  12
 ----
1728 the Solid Inches in a Solid Foot.
```

To meaſure a ſolid of unequal length, breadth, and thickneſs; multiply the length by the breadth, and the Product by the height; the laſt Product will be the Solidity.

*Example.*

What is the Solidity of a Block of Marble, whoſe length is 10 feet; breadth $5\frac{3}{4}$, and depth $3\frac{1}{2}$ feet?

5,75
3,5

2875
1725

20,125
10

20,1250 the Solidity.

The Cone is meaſured by finding the ſuperficial Inches at the bottom or baſe thereof; which multiply by one third of the Inches in the length, and that product is the ſolid quantity in Inches; which Inches divide by 1728, and the Quotient gives the anſwer in ſolid feet.

Example of finding the ſolidity of the cone, decimally, without dividing by 1728.

Let the Diameter of the baſe be 2 feet 6 Inches, and the Altitude 10 feet 6 Inches.

2,5 the Diameter.
2,5

125
50

6,25
,7854

2500
3125
5000
4375

4,908750 4,908750

4,908750 the Area of the Baſe.
3,5 one third of the Height.

24543750
14726250

17,1806250 the Solidity in Feet.

This method may ſerve for tapering timber, or for any other thing of the ſhape repreſented in figure 7.

### *To meaſure a Pyramid.*

*Rule.* Multiply the Area of the Baſe or Bottom by one third of the perpendicular height, and the laſt product will be the content in ſolid feet: or one third part of the Area at the Baſe, multiplied by the whole Altitude, gives the content alſo.

### *Examples of both Ways.*

Suppoſe there is given a ſquare Pyramid (or figure like a Spire Steeple) the ſide of whoſe Baſe is four feet and half, and the perpendicular Height 18 feet: what is the ſolid content?

| | |
|---|---|
| 4,5<br>4,5 | 6,75⅓ of 20, 25 the Area at the Baſe,<br>18 the whole Height. |
| 225<br>180 | 5400<br>675 |
| 20,25<br>6⅓ of the Altitude. | 121,50 *Anſwer*, 121,50 as before. |
| 121,50 *Anſwer* 121 feet, and $\frac{50}{100}$ or $\frac{1}{2}$. | |

When one ſide of the Baſe is longer than the other, as admit one to be 2 *F.* $\frac{1}{2}$, and the other 1 *F.* $\frac{1}{2}$, then multiply the length of the Baſe by the breadth, and that product by one third of the height as before.

If the Baſe be any Polygon, find its Area by the Rule given in page 205; and then multiply it by ⅓ of the Height.

### *To Meaſure the Fruſtrum or Segment, i. e, a Piece or Part of a Pyramid, whoſe ends are ſimilar regular Polygons.*

Multiply together the Sides of the greater and leſſer Polygons; multiply alſo the Difference of thoſe Sides by itſelf; add the 1-3d Part of the ſecond Product to the firſt Product; multiply the Sum by the Height, and by the Number which belongs to the Polygon in Page 205, ſo ſhall the laſt Product be the Solidity.

### *To meaſure the Fruſtrum or Segment of a Cone.*

Multiply together the Diameters at the Top and the Bottom of the Fruſtrum; multiply alſo their Difference by itſelf, add 1-3d Part of the laſt Product to the firſt; and multiply the Sum by the Height of the Fruſtrum, and by the Number 0,7853982; ſo ſhall the laſt Product be the Solidity required.

*Example.*

What is the Solidity of the Fruſtrum of a Cone; the Diameter of the greater End being four Feet, and that of the leſſer End two Feet; and the Height nine Feet.

4          2 Diff. of Diameter.
2          2

8 Product of Diameters; 4; $\frac{1}{3}$ of which is 1 $\frac{1}{3}$.
8 added to 1$\frac{1}{3}$ is 9 $\frac{1}{3}$, which multiplied by 9, the Height, produces 84.

Then multiply 0,7854
by 84

31416
62832

Solidity, 65,9736

Of

## *Of Gauging.*

THERE is a near ſort of kindred or affinity between the art of meaſuring timber, and that of guaging or meaſuring liquors; for both are performed by cube or ſolid meaſure, and therefore not improper cloſely to follow one another. For as often as there is found 1728 ſolid or cubic inches in a piece of Timber, (of what form ſoever) ſo many ſolid feet it is ſaid to contain: So likewiſe in the Art of Gauging, ſo many times as 282 (the ſolid inches in a beer or ale gallon) are found in any veſſel of ſuch liquor, ſo many gallons is ſuch a veſſel ſaid to hold. And ſo of wine; but in that the Diviſor alters, it being 231 ſolid or cubic inches.

And the gallon of dry meaſure contains 272¾ cubical inches.

Note, Every cubical foot in beer or Ale-meaſure contains 6 gallons and almoſt a pint.

The ſame in Wine meaſure is 7 gallons, and almoſt 2 Quarts.

A cubical foot of dry meaſure contains 6 gallons and ſomewhat above one-third of a gallon.

141 inches make 2 quarts of Beer or Ale, 70 inches ½, one quart, and 35 inches ¼, a pint.

To find the contents of any veſſel that hath the form of a cube, that is, a figure whoſe breadth, depth, and length are all equal, and is very well repreſented by the ſhape of a dye commonly played withal.

*Rule.* Multiply the ſide into itſelf, and then again that product by the ſide; which laſt product, if for Beer or Ale, divide by 282, the inches in a Beer or Ale-Gallon; and for Wine, Brandy, &c. by 231, the inches contained in a Wine Gallon.

### *Example.*

Suppoſe a Cube, whoſe ſide is 79 inches, I demand the ſolid content in Beer and Wine Gallons.

```
   79      282)493039(1748 Beer or Ale Gall.
   79          282
  ----         ----
   711         2110        231)493039(2134 Wine Gall.
  553          1974              462
  ----         -----             ----
  6241         1363              310
    79         1128              231
 -----        -----             ----
 56169         2359              793
43687          2256              693
------        -----             ----
493039 Cube inches  103          1009
                                 ----
                                  924
                                 ----
                                   85
                                 ----
```

To find the content of a Parallelopipedon, which is a ſolid figure contained under ſix ſides, of which the oppoſite are Parallel, and of the form of figure the 12th.

*Rule.* Multiply the length by the breadth, and that Product by the depth; and then divide by 282 for Beer or Ale, and 231 for Wine.

*Example.*

Admit the length to be 95 inches, and the breadth 62 inches, and the depth 23 Inches; what is the content in Beer and Wine Gallons.

```
                                     95 Length
                                     62 Breadth
231)135470(586 Wine Gallons.        ----
    1155                            190
    ----                           570
    1997                           ------
    ----                           5890
    &c.
Rem. (104)
```

5890
23 Depth

17670
11780

282)135470(480 Beer Gallons.
1128
&c.

Rem. (110)

*To gauge a Back or ſquare Tun.*

*Example.*

Suppoſe its length 112 Inches, breadth 72 Inches, and its depth 48 Inches; what is its content in ſolid Inches, and alſo its content in Beer Gallons?

| | |
|---|---|
| 112 Length. | 282)387072(1372 Gallons *Anſ.* |
| 72 Breadth. | 282 . . . |
| 224 | 1050 |
| 784 | 846 |
| 8064 | 2047 |
| 48 Depth. | 1974 |
| 64512 | 732 |
| 32256 | 564 |
| 387072 Solid Inches. | (168) |

To bring theſe Gallons into Barrels, divide them by 36, the Gallons in a barrel of Beer, thus:

| | |
|---|---|
| 36)1372(38<br>108<br><br>292<br>288<br><br>(4) | *Anſwer.* 38 Barrels and $\frac{4}{36}$ or $\frac{1}{9}$ of a Barrel; and for the remainder 168, it is ſomething above half a Gallon. |

*Note.* The duty of Exciſe upon ſtrong Beer and Ale is 8s. per Barrel; Brewers are allowed three Barrels in twenty-three for leakage, &c. both for ſtrong and ſmall Beer; and for Ale, two in twenty-two; ſo that the neat Exciſe of a barrel of ſtrong Beer to be paid by the common Brewers, is 6*s.* 7*d.* $\frac{3}{4}$ and $\frac{7}{23}$ of a farthing; and of Ale, 6*s.* 10*d.* $\frac{3}{4}$ and $\frac{7}{18}$ of a farthing; for table Beer 3*s.* and for ſmall Beer 1*s.* 3*d.* $\frac{1}{2}$ and $\frac{2}{3}$ of a farthing.

*How to gauge a Copper, round Tub, or Caſk.*

If it be of equal bigneſs both at top and bottom, find the Cube Inches that it contains, and then bring it into Gallons as before.

But if it be wider at the top than the Bottom, or the contrary; then take the Width or Diameter of the Tub ſomewhat above the middle, next to the broadeſt end, if it be taper; or find the mean Diameter thus: Suppoſe the Bung Diameter to be 26 Inches, and the head Diameter of the caſk to be 23 Inches, the difference between which is 3 Inches, two-thirds of which make two Inches; which added to the leſſer of the two Diameters, makes 25 for the mean Diameter ſought. Having the mean Diameter, proceed to find the content in ſolid inches thus:—Firſt ſquare the mean Diameter, multiply that ſquare by 0,7854, and the product will give the content of the liquor at one Inch deep, and this multiplied by the length, will give the ſolid Inches in the Copper, Tub, or Caſk.

*Example.*

Suppoſe the mean Diameter to be 72 Inches, and the length 56 Inches.

```
       72                  4071,5136
       72                         56
     ----               ------------
      144                  244290816
     504                  203575680
     ----               ------------
     5184 Square.       228004,7616
     ,7854
    ------
    20736
   25920
  41472
 36288
---------
4071,5136 Content at one Inch deep.
```

The above-found ſolid Inches 228004 brought int Gallons, make 808, and 148 ſolid Inches remain, ſomething above half a Gallon; in all 22 Barrels, 16 Gallon and ½ of Beer.

Again, Admit the mean Diameter of a Caſk of Wine t be 14 Inches, and the length 72 Inches, what's the Content in Wine Gallons?

```
  14           07854
  14             196
 ----        -------
  56           47124
 14           70686
 ----         7854
 196         ---------
              153,9384
                    72
             ---------
              3078768
            10775688
            ----------
231) 11083,5648(47,9
        924
        ----
        1843
        1617 Anſwer, 58 Gal. nearly
        ----
         2265
         2079
         ----
          1866
          &c.
```

The Content of a Spheroid may be found thus: multiply the ſquare of the ſhorteſt Diameter by the longeſt Diameter, and then divide by 538 for Beer Gallons, and by 441 for Wine Gallons.

*Example.*

Suppoſe a Spheroid whoſe ſhorteſt Diameter is 74 Inches and the longeſt 125 Inches; what is the Content in Bee and Wine Gallons?

74
74
296
518

5476 the Square of the ſhorteſt Diameter.
125 the longeſt Diameter.

27380
65712

538)684500(1272 Gallons of Beer.
538
1465, &c.
(164)

441)684500(1552 Gallons of Wine.
441
2435, &c.
(68)

To find the Content of a Fruſtrum of a Spheroid: to twice the ſquare of the Bung Diameter, add once the ſquare of the Head, and multiply that ſum by the length: Then for Beer divide by 1077: and for Wine Gallons, divide by 882.

*Example.*

A Caſk whoſe Bung Diameter is 23 Inches, Head Diameter 21 Inches, and Length 27 Inches, what is the Content in Beer and Wine Gallons?

| | |
|---|---|
| 23 | 21 |
| 23 | 21 |
| 69 | 21 |
| 46 | 42 |
| 529 | 441 |

```
    ⎧ 529 ⎫ twice the Square of the Bung Diameter,
add ⎨ 529 ⎬ once that of the Head Diameter.
    ⎩ 441 ⎭
    ─────
     1499
       27 the Length.
    ─────
    10493
    2998
    ─────
1077) 40473 (37 Beer Gallons.
      3231.
      ─────
      8163
      7539                882) 40473 (45 Wine Gallons.
      ─────                    3528.
      (624)                    ─────
                               5193
                               4410
                               ─────
                               (783)
```

## *The Extraction of the Square and Cube Root, of great Uſe in Meaſuring, Gauging, &c.*

### *The Square Root.*

*1ſt.* A Square Number ariſeth from the Multiplication of a Number to itſelf, the Number ſo multiplied being called the Root; thus 4 multiplied by 4, produceth 16; for 16 is a ſquare Number, and 4 is the Root thereof; ſo alſo 4 is the Square of 2, for twice 2 is 4; and 9 is the Root of 81, for 9 times 9 is 81, *&c.*

*2dly,* To extract the ſquare Root of any Number, is to find another Number, which multiplied by (or into) itſelf, produces the number given; and after the root is found, ſuch a multiplication is a proof of the work.

*3dly,* Square Numbers are either ſingle or compound.

*4thly,* All the ſingle Square Numbers, with their reſpective roots, are contained in the following Table, *viz.*

| *Roots* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| *Squares* | 1 | 4 | 9 | 16 | 25 | 36 | 49 | 64 | 81 |

*5thly*, When the ſquare root of any Number leſs than 100 is required, and that Number is not expreſſed in the foregoing Table, then you are to take the root of that ſquare number in the Table, which (being leſs) comes the neareſt to the given number. Thus if the ſquare root of 50 were required, then, ſince 49 is the neareſt ſquare number in the Table, therefore its root, 7, will be the root of the given number, nearly.

*6thly*. A Compound ſquare number, is that which is produced by a number conſiſting of more places than one, multiplied by itſelf, and is never leſs than 100; ſo 729 is a compound ſquare number, produced by the multiplying 27 into itſelf.

*7thly*, The root of any number under 100 may be eaſily known by the foregoing Table of ſingle ſquares: but to extract the root of a compound number of ſeveral places, obſerve the following Directions.

*Example* 1.

Let the ſquare root of the number 45796 be required.

1. Set a point over the place of the Units thus, $4579\dot{6}$, and ſo ſucceſſively over every ſecond figure towards the left hand, as thus, $45\dot{7}9\dot{6}$; and thus, $\dot{4}5\dot{7}9\dot{6}$. But in Decimals, you muſt point from the place of Units towards the right-hand, omitting one place, as above; and if the place of Decimals are odd, affix a cypher towards the Right-hand of them to make them even. Your number thus prepared, draw a crooked line on the right of the number, as in Diviſion; and, indeed, the operation of the ſquare root is not much unlike Diviſion, only there the Diviſor is fixed, and in the ſquare root we are to find a new one for each operation. I ſay, having made a crooked line, thus, $\dot{4}5\dot{7}9\dot{6}($ ſeek in the foregoing Table for the neareſt ſquare to the firſt point on the left-hand, which here is 4, the root of which is 2, which root place on the right-hand of the crooked line, and ſet its ſquare 4 under the ſaid point as below;

$$\begin{array}{l} \dot{4}5\dot{7}9\dot{6}\ (2 \\ \underline{4\phantom{5796}} \\ (0) \end{array}$$

Then ſubtract it, and there remains 0: To the Remainder, bring down the next point 57 thus:

```
 45796 (2
 4
 ----
 057
```

Which call the Reſolvend; then double the Root of the firſt Point, and place it on the left-hand of the Reſolvend, thus:

```
    45796 (2
    4
    -----
 4) 057
```

Call the 4, the Double of the Root 2, thus placed on the left-hand of the crooked line, the Diviſor, and ſeek how often 4, the Diviſor, can be taken in 5, the firſt figure of the Reſolvend 57 (for you are to omit the laſt figure towards the Right-hand) which here is once, place 1 to the Right of the Root 2, and alſo of the Diviſor 4, thus:

```
     45796 (21
     4
     -----
 41) 057
```

Then multiply the Diviſor (now 41) by the figure laſt placed in the Root, *viz.* 1, place it under the Reſolvend, and ſubtract it therefrom.

```
     45796 (21
     4
     -----
 41) 057
      41
     ---
      16
```

Then bring down the next Point, *viz.* 96, and place it on the Right of the remainder 16, for a new Reſolvend, or Dividend, thus: Next double the Quotient, or part of the Root, *viz.* 21, and place it for a new Diviſor to the new Reſolvend 1696, thus:

45796 (21
4
41) 057
41
42) 1696

Then ſeek how oft 42 in 169? (ſtill reſerving or omitting the unit figure of the Reſolvend or Dividend as aforeſaid) and I find I can have it 4 times, which 4 I place in the Quotient and in the Diviſor, and proceeding as before, the Work will appear thus:

45796 (214 Root.
4
41) 057 Reſolvend.
41
424) 1696 Reſolvend.
1696 Product.
(0)

In this laſt operation, I place 4 in the Root, and likewiſe in the Diviſor 42, which makes the new Diviſor 424; to the Reſolvend 1696; which Diviſor multiplied by 4, the figure placed in the root, produces 1696; equal with the Dividend or Reſolvend aforeſaid, as in the operation may be ſeen. Therefore the ſquare root of 45796, is 214; for 214, multiplied into itſelf, produces 45796, the number whoſe ſquare root was ſought.

*Example* 2.

What is the ſquare root of 12299049 (3507 the Root.
9
1ſt Diviſor 65) 329 Reſolvend.
325 Product.
2d Diviſor 700) 490 Reſolvend.
000 Product.

3d

3d Diviſor 7007) 49049 Reſolvend.
49049 Product.

(0).

*Example 3, performed Decimally.*

106,000000(12,649 Root.
1
1ſt Diviſor 22) 060
44
2d Diviſor 246) 1600
1476
3d Diviſor 2524) 12400
10096
4th Diviſor 25289) 230400
227601

2799

Note, *That when the Diviſor cannot be had in the Reſolvend, then place a Cypher in the Quotient, and alſo on the Right of the Diviſor, and then bring down the next Square,* &c. *as in the ſecond Example above may be ſeen.*

Note further, *If any Remainder happen to be after Extraction, you may proceed by annexing Pairs of Cyphers to the left of the given Number, and ſo come to what Exactneſs you pleaſe.*

Note alſo, *Such Numbers given for Extraction that leave Remainders, are by ſome called* Irrationals, *becauſe their Roots cannot be exactly diſcovered, but ſtill there will be ſomething remain, though you work by whole Numbers or Fractions: As in the Example above, where the Remainder is* 2799.

### *The Extraction of the Cube Root.*

TO extract the Cube Root of any Number, is to find another Number, which multiplied by itſelf, and that Product by the Number found, produces the Number given for Extraction.

All ſingle cube Numbers, with their reſpective Roots, are contained in the following Table.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Roots.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| *Square.* | 1 | 4 | 9 | 16 | 25 | 36 | 49 | 64 | 81 |
| *Cube.* | 1 | 8 | 27 | 64 | 125 | 216 | 343 | 512 | 729 |

*1ſt,* To prepare any Number for Extraction, make a Point over Unity, and ſo ſucceſſively over every third Figure, towards the Left-hand in Integers, miſſing two between each Point; but in Decimals you muſt point from the Place of Units to the Right hand, *&c.*

*Example.*

Extract the Cube Root of 46656, prepared thus, as above directed.

$4\dot{6}65\dot{6}$

Here are but two Points, therefore the Root will have but two Places.

*2dly,* The Number being prepared, ſeek in the foregoing Table the neareſt Root to the firſt Point or Period 46, which you will find to be 3, which place in the Quotient thus, $4\dot{6}65\dot{6}$(3; the Cube whereof is 27, which place under your firſt Period 46, as in the Margin; ſubtract it from 46, and there reſts 19; this is your firſt Work, and no more to be repeated. Then to the Remainder 19, bring down the next Period, *viz.* 656 (which is the laſt) and place it on the Right of the Remainder 19.

$4\dot{6}65\dot{6}$(3
27
——
19

46656(3
27
——
19656 Reſolvend.

Then draw a Line under the Reſolvend; next ſquare the 3 placed in the Quotient, which makes 9; which multiplied by 300 makes 2700 for a Diviſor, which place accordingly thus:

$4\dot{6}65\dot{6}$ (3
27
——
2700) 19656

Then ſeek how often 2 in 19? *Anſwer*, but 6 Times becauſe of the Increaſe that will come from the Quotient, and place 6 in the Quotient; then multiply the Diviſor by

6, and the Product will be 16200; which place orderly under the Reſolvend thus.

```
      46656(36
      27
      ---------
 2700)19656
      ---------
      16200
```

Then proceed to find the Increaſe coming from the Quotient thus: Square your laſt Figure 6, and it makes 36; which multiplied by three, the other Figure of the Quotient, it gives 108; which multiplied by 30, makes 3240. This place alſo orderly under the laſt Number before ſet down, *viz.* 16200, and the Work will appear thus.

```
       46656 (36
       27
       -------
 2700) 19656
       -------
       16200
       3240
```

Then cube the Figure laſt placed in the Quotient, *viz.* 6, and it makes 216; which place orderly likewiſe under the Line 3240; add the three Lines together, and they make 19656: which is equal to the Reſolvend above, *viz.* 19656, and there being no more Periods to bring down, I ſee the Work is finiſhed, and find the Cube Root of 46656 to be 36.

This will appear to be true if the Root 36 be multiplied by 36, and that Product by 36 again, for then the Reſult will be 46656 as in the following Operation.

```
     36
     36
  -------
    216
   108
  -------
   1296
     36
  -------
   7776
  3888
  -------
  46656 Proof.
```

### *Some Uſes of the Square and Cube Roots.*

### 1. *To find a mean Proportional between two Numbers.*

*Rule.* THE ſquare Root of the Product of the given Numbers is the mean Proportional ſought, ſo the mean Proportional between 16 and 64, will be 32, for 16 multiplied by 64 produces 1024, and the ſquare of 32 is alſo 1024. This is the Uſe in finding the ſide of a Square equal to any Parallelogram, Rhombus, Rhomboides, Triangle, or Regular Polygon.

### 2. *To find the Side of a Square equal, to the Area of a given Superficies.*

*Rule.* The ſquare Root of the Content of any given Superficies is the Side of the Square.—So if the Content of a given Circle be 160, the Side of the Square equal will be 12,649.

3. *The Area of a Circle being given, to find the Circumference.* See Page 207.

4. *The Area of a Circle being given, to find the Diameter,* See Page 207.

5. *Any two Sides of a Right-angled Triangle being given, to find the third Side.*

This depends upon a mathematical Propoſition, in which it is proved, that the Square of the Hypothenuſe, or longeſt Side of a Right-angled Triangle, is equal to the Sum of the Squares of the Baſe and perpendicular, that is, of the other two Sides.

*See Figure* 13.

*Caſe* 1. Let the Baſe or Ground *BA* repreſent the Breadth of a Moat or Ditch, and the Perpendicular *BC* the Height of a Caſtle, Tower, or City-wall; and the Hypothenuſe *AC*. the Length of a Scaling Ladder.

In this Figure the Baſe *AB* is ſuppoſed to contain 40 Yards; and the perpendicular, or Height of the Tower or Wall, 30 Yards; what Length will the Hypothenuſe *AC*, or Scaling Ladder be?

*Rule.* The ſquare Root of the Sum and the Squares of the Baſe and Perpendicular, is the Length of the Hypothenuſe. See the Work.

1600 the Square of the Baſe 40.
900 the Square of the Perpendicular 30.

The Sum 2500 (50 Yards the Root or Length of the
25 Scaling Ladder.
(0)

*Caſe* 2. If the Length of the Baſe, or Breadth of the Ditch were required; then the ſquare Root of the Difference of the Squares of the Hypothenuſe and Perpendicular is the Length of the Baſe, or Breadth of the Ditch or Moat. See the Work.

2500 the Square of the Hypothenuſe *AC*.
900 the Square of the Perpend. *BC*.

The Differ. 1600 (40 Yards the Root or Breadth of the
16 Ditch.
(0)

*Caſe* 3. If the Height of the Tower or Perpendicular *BC* were required; then the ſquare Root of the Difference of the Squares of the Hypothenuſe and Baſe, is the Height of the Perpendicular *BC*.

6. *Any Number of Men being given to be formed into a ſquare Battalion, to find the Number of Rank and File.*

*Rule.* The ſquare Root of the Number of Men given, will be the Number of Men to be placed in Rank and File.

*Example.* Admit an Army of 32400 Men were to be formed into a ſquare Battalion; the ſquare Root of 32400 will be found to be 180, and ſo many Men muſt be placed in Rank, and alſo File.

7. *To find the Side of a Square, Polygon, or the Diameter of a Circle, which ſhall be to any other given Square, ſimilar Polygon, or Circle, in a given Proportion.*

*Rule.* Since like Surfaces are to each other, in a duplicate Proportion of their like Sides; therefore,

As the given Circle, Square or Polygon,
Is to the required Circle, Square or Polygon;
So is the Square of the Diameter, or Side of the firſt,
To the Square of the Diameter, or Side of the ſecond.

Then the Square Root of the Reſult of the above Proportion will be the Diameter or Side required.

*Example* 1. There is a Circle whoſe Diameter is 11; what will the Diameter of that Circle be, whoſe Area is four Times the Area thereof?

Here 11 Times 11 is 121: and
As 1———4::———121
4
484 (22 the Anſwer.
4
42) 84
84

*Example* 2. There are two ſimilar Polygons, whoſe Areas are as 9 to 25, and the Side of the leſſer is 12 Yards; what is the Side of the greater?

Here 12 Times 12 is 144; and
As 9———25———144
25
720
288
9) 3600
400 (20 the Anſwer.
4
000

8. *The Uſes of the Cube Root are to find out the Dimenſions of like Solids, as Globes, Cylinders, Cubes, &c.*

*Rule.* Since like Solids are to each other, as the Cubes of the like Sides or Diameters; therefore,
As the Content or weight of a given Solid,
Is to the Content or Weight of another like Solid;

So is the Cube of the ſide, or Diameter, of the one,
To the Cube of the ſide, or Diameter, of the other.
Then the Cube Root of the Reſult will be the Length of the ſide or Diameter required.

*Example* 1.

If a Bullet that weighs 72*lb.* is 8 Inches in Diameter, what will be the Diameter of that Bullet that weighs 9*lb.*?
Here the Cube of 8 is 512; and

```
As 72——9————512
              9
           ————
      72) 4608 (64
          432
          ————
           288
           288
          ————
```

Then the Cube Root of 64, *viz.* 4, is the Diameter required.

*Example* 2.

If a Ship of 100 Tons be 44 Feet long at the Keel, of what length muſt the Keel of a Ship be that carries 220 Tons?

Say, as 100 is to 220: So is the Cube of 44, *viz.* 85184, to 187404,8; whoſe Cube Root is 57,226, the length of the Keel ſought.

*Example* 3.

There is a Cubical Veſſel whoſe ſide is 12 Inches, and it is required to find the ſide of a Veſſel that holds three times as much. Here the Cube of 12 is 1728, which multiplied

```
by————————————————3
                 ————
Produces—————————5184
```

the Cube Root of which is 17,306 the *Anſwer* required, or ſide ſought.

*An eaſy Rule to find the Length of the Maſts of a Ship,* viz.

Two thirds the length of the Keel, and the breadth of the Beam, is the length of the main-maſt; and the Rule is, therefore, to multiply the length of the Keel by 2, and to divide the Product by 3, and then to the Quotient add the breadth of the Beam, and the Total is the length of the Main-maſt.

*Example.*

Suppoſe a ſhip to be 108 Feet by the Keel, and 40 feet by the Beam, what is the length of her Main-maſt.

108 *per* Keel.
2

3)216

Add { 72 two thirds of the Keel.
40 the Breadth of the Beam.

112

*Anſwer*, The length of her Main-maſt is 112 feet, as in the Work.

*Again.*

Admit a ſhip to be 84 feet by the Keel, and 31 feet by the Beam, what is the length of her Main-maſt?

84 *per* Keel.
2

3)168

Add { 56 two thirds of the Keel.
31 the breadth of the Beam.

*Anſwer*, 87 feet the length of the Main-maſt.

*Another Way to find the length and Thickneſs of Maſts and Yards*, viz.

The way to find the Length of the Main-maſt is to add the breadth of the Beam, and the depth of the Hold, in feet together, and divide the Total by 1, 5, and the Quotient will be the length of the Main-maſt in Yards.

*Example.*

Admit a ſhip whoſe Keel in length is 73 feet, and the breadth of the Beam 28, 5 feet, and the depth of the Hold 12 feet; what is the length of the Main-maſt?

*Feet.*
28,5 Breadth of the Beam.
12,0 Depth of the Hold.

1,5)40,5(27 Yards, *Anſwer.*
30
105
(0)

*Anſwer*, 27 Yards, or 81 Feet, as *per* Work.

To find the thickneſs of the Maſt, having the length, ſay, by the rule of proportion (or rule of three) if 84 feet long require 28 inches thick, what 81 feet long? as in the following Work.

*F.* *In. thick.* *F.*
If 84——————28——————81
81
28
224
84)2268(27 Inches thick, *Anſwer.*
168
588
588
(0)

The conſtruction of ſome uſeful Geometrical Problems.

*At a given point near the middle of a right Line, given to erect a perpendicular. See figure the 14th.*

LET *C D* be the Line given; to have a Perpendicular erected on it from the point *B*; with the Compaſſes (opened at a convenient diſtance) place one foot at the point *B*, and with the other make the two marks *E* and *F*, on either ſide of *B*; then, having the ſame, or any other more convenient diſtance in the Compaſſes, ſet one point at E, and with the other deſcribe the Arc G G; which being done, without altering the diſtance laſt uſed, ſet one foot at F, and with the other deſcribe the Arc H H, croſſing the former at the point A; through which Interſection with a ruler draw a line from A to B, which will be perpendicular to the line C D.

### 2. *How to raiſe a Perpendicular at or near the end of a Line.*

This is effected ſeveral ways; but I ſhall inſtance only two, which are very eaſy.—*See figure* 15.

### *Firſt Method.*

Suppoſe the line *A B* be given to raiſe a Perpendicular near the end, *A*.

Firſt open your Compaſſes to a convenient diſtance, and ſet one foot on the point *A*; and with the other deſcribe the Arc *F E D*; then with one foot of the Compaſſes in *D*, (they retaining the ſame diſtance) croſs the Arc in *E*; and then ſetting one foot in *E*, with the other make the Arc *A F G*, croſſing the firſt Arc in *F*. Again ſet one foot in *F*, and with the other deſcribe the ſmall Arc *H H*, croſſing the former in the point *C*; ſo the lIne *A C* being drawn, will be the Perpendicular required.

### *The Second Method.*

Admit *B* to be the point given on which to draw the perpendicular *B I*. Open the Compaſſes to any convenient diſtance; and ſetting one foot on the point *B*, pitch down the other foot at random, as ſuppoſe at *K*, then the foot reſting in *K*, turn the other about till it croſs the line *A B* in *L*; then draw the line *K L*, and continue the ſame beyond *K*, ſetting off the ſame diſtance *K L*, (at which the Compaſſes already ſtand) from *K* to *M*, ſo a line drawn from *B*, through *M*, will be the perpendicular required.

### 3. *How to divide a Right Line into two equal Parts. See figure the* 16*th*.

Suppoſe the line *A B* be given to be divided into two equal parts. Take in the Compaſſes any diſtance above half the Length of *A B*, and ſetting one Foot on the Poin *A*, with the other draw the Arc *F D E*; then (with th Compaſſes unaltered) ſet one Foot in *B*, and with th other croſs the former Arc both above and below th Line, in the Points *F* and *G*, then a Line drawn from to *G* ſhall interſect, or cut the given Line in *H*, and divide the Line *A B* into equal Parts, *A H* and *D B*.

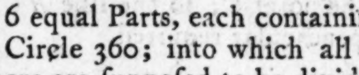
4. *A Line being given, how to draw another Line paralle thereunto, at any Diſtance required, or through any Poin aſſigned.*

Of parallel Lines there are two Sorts, viz. *Straight* o *Circular*. And all Circles drawn on the ſame Centre, whether greater or leſſer one than the other, or ſaid to b parallel or concentric, that is having one common Centre. *See* Figure the 17th.

In this Figure the Circle *A B C D* is concentric or parallel to the Circles *E F G H*, becauſe both of them are drawn from the ſame Centre. The Line *A C* is the Diameter of the greater Circle, and the Line *E G* of the leſſer Circle. And all right Lines drawn from the Centre to either of the circumferences, are equal with reſpect to their Periphery; and ſuch Lines are called half Diameters, and ſometimes the Radius of the Circle, and will divide the Circle into 6 equal Parts, each containing 60 Degrees, and the whole Circle 360; into which all the great Circles of the Sphere are ſuppoſed to be divided.

### *Of Parallel Right Lines.*

Right-lined Parallels, are Lines drawn on a Plane of equal Length and Diſtance; and though infinitely extended will never meet, and in all Parts retain an equal Diſtance ſuch as theſe underneath.



*To draw a Right Line parallel to another Right Line at a Diſtance given.* See Figure the 18th.

Take in your Compaſſes the given Diſtance *G H*; then ſetting one Foot in *E*, draw the Arc *I K*; then moving to *F*, deſcribe the Arc *L M*; then laying a Ruler on the Top of the two Arcs, juſt touching them, draw the Line *N O* which will be parallel to the given Line *E F*.

### 5. *Through any three Points (not in a ſtraight Line) to deſcribe a Circle. See* Figure the 19th.

Let the Points given be *A*, *B*, and *C*, through which it is required that a Circle be drawn. Firſt, ſet one Foot of the Compaſſes in one of the given Points, as ſuppoſe in *A*, and extend the other Foot to *B*, another of the Points, and draw the Arc of a Circle *G F D*; then (the Compaſſes not altered) ſet one Foot in *B*, and with the other croſs the ſaid Arc with two ſmall Arcs, in the Points *D* and *E*; and draw the Line *DE*. Thirdly, ſet one Foot in *C* (the Compaſſes being at the ſame Diſtance) and with the other Foot croſs the firſt Arc *G F D* in the Points *F* and *G*, and draw the Line *FG*, croſſing the Line *DE* in the Point *O*, which is the Centre ſought for; in which, place one Foot of the Compaſſes, and deſcribe the Circle at the Diſtance *O A*, and it will paſs through all the given Points, *A*, *B*, and *C*.

### *How to make the Line of Chords geometrically to any aſſigned Length, or Radius.*

Since in the Art of Dialling, there is frequent Uſe made of the Line of Chords, it is proper here to ſhew the making thereof.

A Line of Chords is 90 Degrees of the Arc of a Circle transferred from the Limb of the Circle, to a ſtraight Line; now every Circle, whether great or ſmall, is divided (or ſuppoſed to be) into 360 equal Parts, called Degrees; ſo the Semi or half Circle contains 180; the Quadrant or Quarter 90, and the Radius or Semi-Diameter (which is that Line with which the Circle or Semi-Circle is drawn or deſcribed) is always equal to 60 Degrees of that Circle which it deſcribes, and therefore 60 Degrees of a Line.

### *To make the Line of Chords*; as in Figure the 20th.

Firſt draw a Line to any Length, *C B D*, and on the Middle thereof erect the Perpendicular *A B*; next open your Compaſſes to the Radius or Length that you would have your Line of Chords be of; which admit *AB*, and with that Diſtance on *B* as the Centre, deſcribe or draw the Semi-

Circle *C A D* which is divided into two equal Parts or Quadrants by the Perpendicular Line *A B*: thirdly, divide the Arc or Quadrant *A D*, into 90 equal Parts or Degrees; which is done by taking the Length of the Line *A B*, and ſetting that Diſtance on the Quadrant *A D*, and from *D* to *R*; ſo is *D R* 60 Degrees, and *A R* 30 Degrees; then take the Diſtance *A R*, and ſet from *D* to *S*, ſo is the Quadrant divided into three equal Parts, as the Points *S* and *R*, each containing 30 Degrees: This done, divide the ſeveral Spaces between *AR*, *RS*, *SD*, into three equal Parts, each of which will be 10 Degrees according as the Numbers are ſeen and ſet apart to them. And theſe again divided into two equal Parts, each Part contains 5 Degrees; and every of thoſe into five ſmaller as in the Repreſentation: and ſo the whole Quadrant is divided into 90 Degrees. Fourthly, the Quadrant *ARSD* being thus divided into 20 Degrees, ſet one Foot of the Compaſſes in *D*, and open the Foot to *A*, and deſcribe the Arc *AEF*, touching the Line *CD* in *F*, ſo is the Point *F*, upon the right Line *CD*, the Chord of 90 Degrees. Fifthly, open the Compaſſes from *D* to 80 Degrees, and deſcribe the Arc 80 *GH*; ſo ſhall the Point *H* be the Chord of 80 Degrees, and deſcribe the Arc 80 *GH*: ſo ſhall the Point *H* be the Chord of 80 Degrees. Sixthly, open the Compaſſes from *D* to 70, deſcribe the Arc 70 *IK*, ſo is *K* the Chord of 70 Degrees. Again, open the Compaſſes from *D* to *R*, the Radius of 60 Degrees, and deſcribe the Arc *RLR*, ſo is *R* the Chord of 60 Degrees, equal to the Radius. Do the ſame by 50, 40, 36, 20, and 10, and then you will have the Line *DF* divided into 90 unequal Parts, called Chords, as in Figure 20.

Thus much for the Line of Chords frequently made Uſe of in Dialling, where there is not the Conveniency of having a Mathemetical Inſtrument Maker near at Hand.

Note, *A Degree is the 360th Part of the Globe, or of any Circle; and each Degree is ſuppoſed to be divided into 60 Parts, called Minutes; ſo that 45 Minutes is three Quarters of a Degree, and 30 Minutes half a Deegree, and 15 Minutes one Quarter of a Degree.*

### *Inſtrumental Arithmetic.*

AS Problems or Queſtions in Meaſurement, &c. are ſolved or anſwered arithmetically by the Pen, ſo are they inſtrumentally taken by Compaſſes, from certain

Lines

ines, &c. or Rules made for that Purpoſe, for the Help ſ thoſe that are deficient in Arithmetic, or for a quicker iſpatch of Buſineſs; and ſuch Performances are called *ſtrumental Arithmetic*; and of theſe Inſtruments, the moſt Vogue or Uſe, are theſe three: 1. The Carpenters ain Rule: 2 *Gunter's* Line: 3. *Coggeſhall's* ſliding Rule.

### *The Carpenter's Plain Rule.*

I ſhall deſcribe and ſay ſomething of the *Carpenter's Plain ule*, in relation to its Uſes, &c.

### Its Deſcription.

This Rule is made uſe of in meaſuring Boards and Timr, being two Feet in Length, and divided into twentyur Parts or Inches, and every one of thoſe Parts or ches ſubdivided into half Inches, and each of thoſe alves into Quarters, and each Quarter into two Parts; that every Inch is divided into eight Parts, and the hole Length into 192 Parts.

This Rule is well known, and therefore not abſolutely ceſſary of Repreſentation; but however, for the better derſtanding it, I ſhall give one thus:

nder Board Meaſure thus deſcribed.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 1 7 |
| 12 | 6 | 4 | 3 | 2 | 2 | |
| 0 | 0 | 0 | 0 | 4 | 0 | |

This Line begins at 6, and goes on to 36, within 4 ches of the Rule on the Right-hand.

### *Its Uſe.*

| | *In. dp.* | *Feet* | *In.* | *Pts.* | |
|---|---|---|---|---|---|
| a Board be | 1 | 12 | 0 | 0 | in Length make a Foot ſquare. |
| | 2 | 6 | 0 | 0 | |
| | 3 | 4 | 0 | 0 | |
| | 4 | 3 | 0 | 0 | |
| | 5 | 2 | 4 | 5 | |
| | 6 | 2 | 0 | 0 | |

By this Table it is manifeſt, and eaſily underſtood, That Board of 4 Inches, requires 3 Feet in Length to make a foot ſquare, and a piece of 3 Inches broad, will requi 4 feet in length to make a foot ſquare, &c.

At the other End of this Rule is a Table called Und Timber Meaſure; and thus deſcribed,

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 144 | 36 | 16 | 9 | 5 | 4 | 2 | 2 |
| 0 | 0 | 0 | 0 | 9 | 0 | 11 | 3 |

This line begins at 8 and half, and goes on by Diviſions to 36.

| | *In. Square* | *Feet* | |
|---|---|---|---|
| In a Piece of Timber of | 1 | 144, 0 | In Length make a ſolid foot. |
| | 2 | 36, 0 | |
| | 3 | 16, 0 | |
| | 4 | 9, 0 | |
| | 5 | 5, 9 | |
| | 6 | 4, 0 | |
| | 7 | 2, 11 | |
| | 8 | 2, 3 | |

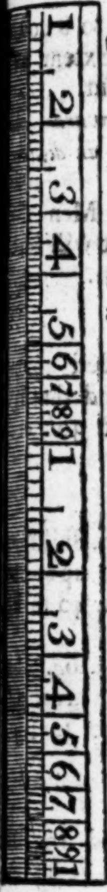
By this Table it is plain, that if a piece of Timber i 6 Inches Square, then 4 feet in length of that piece wil make a ſolid foot.

It is a common method with Carpenters to add th breadth and thickneſs of a piece of Timber in Inches together, and call the half thereof the ſide of the ſquare of tha piece; but this method gives the content more than it is; and the greater the difference the larger the Error. But the true ſquare may be found in *Gunter's Line*, thus: place one point of the Compaſſes upon the line at the thickneſs, and the other at the breadth; then half of that extent will reach, from either the breadth or thickneſs, to the ſide of the true ſquare in Inches.

### 2. *Gunter's Line.*

This line is commonly ſet on the Carpenter's plain Rule and conſiſts of two lines numbered 1, 2, 3, &c. one ſet at the end of the other, and it is ſomewhat of the following form.

*unter's Line.*



To prove the line by the Compaſſes obſerve that the

| | | | | |
|---|---|---|---|---|
| Diſtance from | 1 to 2 | is equal to the Diſtance from | 2 to 4 | &c. |
| | 5 to 10 | | 4 to 8 | |
| | 4 to 8 | | 3 to 6 | |

*To number on Gunter's Line.*

Obſerve, that the figures 1, 2, 3, 4, 5, 6, 7, 8, 9, ſometimes ſignify themſelves ſimply, or alone; at other times 10, 20, 30, 40, *&c.* Again, at other times, 100, 200, 300, or 1000, *&c.*

*To find a Number on the line, as ſuppoſe* 134.

For the figure 1, account 1 on the Line: and for 3, take 3 of the largeſt Diviſions; and for 4 take 4 of the ſmaller Diviſions; and that is the point: Again, to find 750 on the Line: For 7 take 7 on the Line, for 50 take 5 of the great Diviſions, and that is the point.

*To find a ſmall Number on the line; as ſuppoſe* 12.

For 10, take 1 as before, and for 2 take 2 of the large Diviſions, and that is the Point.

In meaſuring Boards or Timber, it is beſt to have a line of 2 feet long, and Compaſſes 1 foot long.

*Note*, Let the meaſurement be by the Inch, Foot, Yard, Pole, Rod, *&c.* it is beſt to have it Decimally divided, or ſo ſuppoſed, that is, into 10th Parts.

*Note alſo*, That if one point of the Compaſſes reach beyond the Line in the Work, remove the other point to the ſame figure or place on the other Line.

### *Multiplication by* Gunter's *Line.*

To multiply 5 by 7, ſet one foot of the Compaſſes on it in the left-hand line, and extend the other to 5 upwards, or toward the right-hand, and with the ſame extent place one foot in 7, and the other foot will fall on 35 in the right-hand line, which is the Anſwer.

*Diviſion*

### *Diviſion in* Gunter's *Line.*

*Example* 1. Divide 63 by 3; extend from 3 to 1 dow wards, or towards the Left-hand, and the Extent w reach the ſame Way from 63 to 21 the Quotient.

N. B. *In multiplying you muſt always extend upwards, th is, from* 1, *to* 2, 3, 4, &c. *and on the contrary, in divid extend downwards.*

*Example* 2. Divide 288*l.* equally among 16 Men: E tend from 16 to 1 downwards; and that Extent will rea the ſame Way, from 288*l.* to 18*l.* for each Man.

### Again.

*Example* 1. Suppoſe 750*l.* were to be divided amon 25 Men: Extend from 25 to 1 downwards; and that E tent will reach the ſame Way, from 750*l.* to 30*l.* ea Man's Share.

### *Rule of Three Direct.*

*Example* 1. If 5 Buſhels of Barley coſt 11 Shilling what will 40 Buſhels coſt? extend from 5 to 11 upward and that Extent will reach the ſame Way, from 40 to 8 the Shillings required.

*Example* 2. If three Ells of Holland coſt 10*s.* 6*d.* wh will 40 Ells coſt? extend from 3 to 10½ upwards, a that Extent the ſame Way, will reach from 40 to 140 the Anſwer.

### *The Uſe in Board Meaſure.*

*Example.* If a Board be 9 Inches broad, and 19 Fe long, what is the Contents ſuperficial ſquare Feet? ex tend from 12 (the Centre of Foot Meaſure) to 9 dow wards, and that Extent the ſame Way, will reach fro 89 to 14 and ¼.

### *In Timber Meaſure.*

*Example.* A piece of Timber 24 Inches Square, and Feet long, what is the Content in ſolid Feet? extend fro 12 the Centre, to 24 upwards, and that Extent twice th ſame Way, will reach from 8 to 32 Feet the Contents.

### *Brick Work.*

How many Rods of Work are there in 4085 Feet? ex tended from 272 downwards to 2, and that Extent th ſame Way from 4085, will reach 15 Rods, the Anſwer.

## 3. Coggeſhall's *Sliding Rule.*

The next Inſtrument I ſhall ſpeak of, is that which goes by the Name of *Coggeſhall's Sliding Rule.* And firſt of

### *Its Deſcription.*

This Rule is framed 3 Ways; ſliding by one another as the Glazier's Rule; ſliding on one Side of a two Feet Joint-rule; and one Part ſliding on the other, in a Foot of Length; the back Part being flat, on which are ſundry Lines and Scales.

Upon the aforeſaid ſliding Side of the Rule, are four Lines of Numbers, three are double Lines, and one a ſingle Line of Numbers, marked with *A B C* and *D*, the three marked *A B* and *C*, are called double Lines of Numbers, and figured 1, 2, 3, 4, 5, 6, 7, 8, 9. Then 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10, at the End. That marked *D* is the ſingle Line of Numbers, and figured 4, 5, 6, 7, 8, 9, 10, 20, 30, and at the End 40, even with and under 10, in the double Line next to it; and that is called the Girt Line, and ſo marked in the Figure.

The Figures on the three double Lines of Numbers, may be increaſed or decreaſed at Pleaſure; thus 1 at the beginning may be called 10, 100 or 1000; and 2 is 20, 200, or 2000; ſo that when 1 at the beginning is 10, then 1 in the Middle is 100, and 10 at the End is 1000; but if 1 at the beginning is accounted for 1, then 1 in the Middle is 10, and 10 at the End is 100.

And as the Figures are altered, ſo muſt the Strokes or Diviſions between them be altered in their Value, according to the Number of the Parts they are divided into; as thus, from 1 to 2, it is divided into 10 Parts, and each Tenth is divided into 5 Parts; and from 2 to 3, it is divided into 10 Parts, and each Tenth into 2 Parts, and ſo on from 3 to 5; then from 5 to 6, it is divided into 10 Parts only; and ſo on unto 1 in the Middle of the Rule, or the End of the firſt Part of the double Line of Numbers. The ſecond Part of the double Line is divided like the firſt.

The Girt Line marked *D*, is divided from 4 to 5 into 10 Parts, and each 10th into 2 Parts, and ſo on from 5 to 10; and then from 10 to 20, it is divided into 10 Parts, and each Tenth into 4 Parts; and ſo on all the Way from

20

20 to 40 at the End, which is right againſt 10 at the End of the double Line of Numbers.

The Lines on the Back-ſide of this Rule that ſlide on one Side, are theſe, *viz.* a Line of the Inch Meaſure from 1 to 12, each divided into Halves, Quarters, and Half-quarters; another Line of Inch Meaſure from 1 to 12, each divided into 12 equal Parts, and a Line of Foot Meaſure, being 1 Foot divided into 100 equal Parts, and figured 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100, even with 12 on Inch Meaſure.

And the Back-ſide of the ſliding Piece is divided into Inches, Halves, Quarters, and Half-quarters, and figured from 12 to 24, ſo that it may be ſlid out to 2 Feet to meaſure the Length of a Tree, or any thing elſe you have occaſion to meaſure.

### *The Uſe of the double Scale.*

*Example.*

Suppoſe there is a Geometrical Square, whoſe Sides are 3 Feet $\frac{1}{2}$ each: ſet 1 Foot on the Line *B*, to 3 $\frac{1}{2}$ on the Line *A*; and then againſt 3 $\frac{1}{2}$ on the Line *B*, is 12 Foot $\frac{1}{4}$ on the Line *A*, which is Content of ſuch a Square.

$$\begin{array}{l} \quad\textit{F. Pts} \\ \quad 3—6 \\ \left.\begin{array}{r} 3—6 \\ \hline 10—6 \\ 1—9 \\ \hline \end{array}\right\}\text{Arithmetically.} \\ 12—3\ \text{Proof.} \end{array}$$

Suppoſe the Side of a Rhombus be 8 Feet 6 Inches $\frac{1}{4}$, and the Breadth of the Line *AB* 8 *F*. 4$\frac{1}{4}$, what is the Content? Set one Foot on the Line *B* to 8 Feet $\frac{52}{100}$ on the Line *A*, then again 8 Feet $\frac{52}{100}$ on the Line *B*, is 71 Feet $\frac{10}{100}$ Parts of a Foot on the Line *A*, and to know the Value of the Decimal, or Part of the Foot, look for $\frac{10}{100}$ on the Rule, and you will find againſt it 4 Inches $\frac{1}{4}$, ſo that the Content of this Rhombus is 71 Feet, 4 Inches $\frac{1}{4}$.

Again, ſuppoſe the Length of a Rhomboides to be 14 *F*. $\frac{2}{3}$ or 17 $\frac{25}{100}$ and the Breadth 8 F. 7 or 8 $\frac{15}{100}$, what is the

Content? Set one Foot on the Line *B* to 17, 25 on the Line *A*, then againſt 8, 58 on the Line *B*, is 148 Feet on the Line *A*. The Figure hath been preſented before and opeated arithmetically, therefore it is here unneceſſary.

Let the Baſe of a Triangle be 4 Feet 1 Inch $\frac{3}{4}$ and the Perpendicular 2 Feet 1 $\frac{3}{4}$; the Half of the one, in 2 Feet 7 Parts; and of the other 1 Foot 7 Parts. Set one on the Line *B*, to 4, 15 on the Line *A*; then againſt 1, 07 half he Perpendicular on the Line *B*, is 4 Feet and almoſt $\frac{1}{2}$ a Foot for the Content. Or if you ſet 1 on the Line *B*, to , 07 on the Line *A*, againſt 4, 15 on the Line *B*, is 4, nd almoſt $\frac{1}{2}$ Foot on the Line *A*.

Again another Way. If you ſet one on the Line *B* to , 1 on the Line *A*, then againſt 2, 25 on the Line *B* is 8 Feet $\frac{9}{10}$ (which is about 11 Inches) on the Line *A*, the alf whereof is 4 Feet 5 Inches $\frac{1}{2}$, which is the Content of he Triangle.

## *GEOGRAPHY.*

Geography is the Art of decribing the Figure, Magitude, and Poſition of the Surface of the Earth and eas, and their Parts.

Many and ſufficient Arguments may be produced to prove hat he Earth and Seas are of a ſpherical or globular Fiure; one of them may be ſufficient in this Place, *viz.* hat Ships in ſailing from High Capes or Head Lands, loſe ight of the lower Parts firſt; and continue gradually to oſe Sight of thoſe which are ſituate higher and higher, ill at laſt the Top vaniſhes; which could not be unleſs the urface of the Sea was convex; now this Convexity of the ea is found to be uniform in all Parts thereof, therefore e Surface of the Waters is ſpherical; which being grantd, that of the Land muſt be nearly ſo, becauſe its Exemity ſets Limits to the Waters.

The whole Body of the Earth and Seas is therefore lled the terraqueous Globe.

Since, as has been before obſerved, all Circles are diided into 360 Degrees, therefore any great Circle ſurounding the terraqueous Globe, is uſually ſo divided. ur ngenious Countryman, Mr. *Richard Norwood*, about e Year 1635, by an accurate Meaſurement of the Diſnce between *London* and *York*, found that a Degree of a eat Circle was about 69 $\frac{1}{2}$ Statute Miles in Length, and conſequently that the Circumference of the terraqueous Globe was 25,020 Miles; whence its Diameter will be 7964 Miles.

The Sea covers the greater Part of the terraqueous Globe, out of which the Land riſes with very ſlow Aſcents, the Height of the loftieſt Mountains thereof being hardly the four-thouſandth Part of the above found Diameter, which is but juſt ſufficient to give the Rivers a ſlow and eaſy Deſcent.

Geographers have found it neceſſary to imagine certain Circles to be drawn on the Surface of the Earth, for the better Determination of the Poſitions of Places thereon.

Theſe are either greater or leſſer Circles; great Circles divide the Globe into two equal Parts, the leſſer Circles divide it into two unequal Parts.

There are ſix Kinds of great Circles; two of them, viz. the Equator, or Equinoctial, and the Ecliptic, are fixed; but the others, viz. the Meridians, the Circles of Longitude, the Horizons, and the vertical Circles, are variable, according to the Part of the Globe they are appropriated to.

There are two Points on the Surface of the terraqueous Globe, called the *Poles of the Earth*, which are diametrically oppoſite to each other; the one is called the *North*, and the other the *South, Pole*.

The Equator is that great Circle which is equally diſtant from both the above-mentioned Poles, and is ſo called from its dividing the terraqueous Globe into two equal Parts, named from the Poles which are ſituated in each, the Northern and Southern Hemiſpheres. It is alſo called Equinoctial, becauſe when the Sun enters it, the Days and Nights are of equal Length in all Parts of the Globe. Seamen commonly call this Circle the *Line*.

Meridians, or Circles of terreſtrial Longitude, are ſuppoſed to be drawn perpendicular to the Equator, and to paſs through the Poles: They are called Meridians, or Mid-day Circles, becauſe when the Sun comes to the Meridian of any Place, it is Noon or Mid-day at that Place.

Hence every particular Place on the Surface of the terraqueous Globe hath its proper Meridian, and conſequently a Traveller who doth not directly approach to, or recede from one of the Poles, is continually changing his Meridian.

With reſpect to the two Circles above deſcribed, every Place upon the Earth is ſaid to have its particular Latitude and Longitude.

The Latitude of any Place upon Earth, is its Diſtance from the Equator, in a Direct Line towards one of the Poles; and ſince the Meridians proceed in ſuch a Direct Line, therefore Latitude is reckoned in Degrees, and Parts of Degrees, on the Meridians of the Place.

The Longitude of any Place upon Earth, is the Eaſt or Weſt Diſtance of the Meridian of that Place, from ſome fixed Meridian, at which Longitude is ſuppoſed to begin. Now, ſince all the Meridians paſs through the Poles, they coincide with one another at thoſe Points, and their greateſt Diſtance from each other will be, when they are fartheſt from thoſe Points of Coincidence, *viz.* at the Equator; therefore, Longitude is reckoned in Degrees, and Parts of a Degree, of the Equator.

Geographers have differed very much in the Meridian, from whence they have aſſumed the Beginning of Longitude; the Ancients choſe the Meridian of the *Canaries*, which they called the Fortunate Iſlands; others have pitched upon the Iſlands *Azores*, or the Weſtern Iſlands; but the moſt uſual Way is now to reckon Longitude from the Capital of that Country in which an Author writes, and accordingly the Longitude is hereafter reckoned from the Meridian of *London*.

Parallels of Latitude are ſmall Circles drawn parallel to the Equator at any aſſigned Diſtance therefrom; therefore every particular Place on the Surface of the terraqueous Globe, hath its proper Parallel of Latitude.

There are four of theſe Parallels of Latitude that are particularly remarkable, *viz.* the two Tropics, and the two Polar Circles; but for the better Explanation of thoſe Properties, it will be neceſſary, firſt, to define the Ecliptic.

The Ecliptic is that great Circle in which the Sun ſeems to perform its annual Motion round the Earth; this Circle makes an Angle with the Equator of 23° 29′; it interſects it in two oppoſite Points called the Equinoctial Points; and thoſe two Points in the Ecliptic, which are fartheſt from the Equinoctial Points, are called the Solſtitial Points.

The Tropic of Cancer is a Parallel of Latitude 23° 29′ diſtant from the Equator in the Northern Hemiſphere, paſſing through the Northern Solſtitial Point of the Ecliptic as before deſcribed: And,

The Tropic of Capricorn is a Parallel of Latitude, as far diſtant in the Southern Hemiſphere, paſſing through the Southern Solſtitial Point.

The Arctic Polar Circle is a Parallel of Latitude, 23° 29′ diſtant from the North Pole; and the Antarctic Polar Circle is a Parallel of Latitude, as far diſtant from the South Pole.

The Tropics and Polar Circles divide the Globe into five Parts, called Zones; that is to ſay, Girdles or Belts; one of them is called the Torrid; two Temperate; and two, Frigid.

The Torrid Zone, ſo called from the great Heat of the Sun (which verticles, or paſſes directly over the Heads of the Inhabitants twice in a Year) is ſituated between the two Tropics, and is therefore about 47 Degrees in Breadth; the Inhabitants are called *Amphicians*; that is ſuch as have their ſhadows caſt both Ways, the Sun being ſeen at Noon ſometimes to the North, and at other Times to the South of them.

The Northern Temperate Zone is ſituated between the Tropic of *Cancer*, and the Arctic Polar Circle; and the Southern Temperate Zone, between the Tropic of *Capricorn*, and the Antarctic Polar Circle: They are each of them about 43 Degrees broad: The Inhabitants are called *Heteroſcians*, that is, ſuch as have their Shadow but one Way; for at Noon the Shadows of the Inhabitants of the Northern Temperate Zone, are always caſt Northward; and thoſe of the Inhabitants of the Southern Southward.

The Frigid Zones contain all that Space between the Polar Circles and the Poles themſelves; the Northern Frigid Zone being ſurrounded by the Arctic Circle, and the Southern by the Antarctic. The Inhabitants are called *Periſcians*, becauſe (when the Sun is on the ſame Side of the Equator as thoſe Inhabitants are) their Shadows are (in the Space of 24 Hours) caſt of all Sides, or quite round them. The Sun does not ſet in the Places within theſe Zones, during ſeveral ſucceſſive Revolutions or Days in the Summer; and in the Winter he doth not riſe for a like Space of Time. At the Poles themſelves the Sun is viſible for half the Year, and inviſible for the other half.

If any Place on the Globe (except the Poles and Equator) be particularly conſidered, there will be three other Places on the ſame Meridian, which have more immediately a Relation thereto, *viz.* 1. That Place which has the ſame Latitude on the other Side of the Equator. The Inhabitants of this Place are called *Antœci* or *Antœcians:* They have Mid-day and Mid-night at the ſame Time with thoſe of the Place aſſumed; but the Seaſons of the Year are different, the Summer of the one being the Winter of the other.

2. That Place, which is on the ſame Parallel of Latitude, but is 110 Degrees different in Longitude. The Inhabitants of this Place are called *Periœci* or *Periœcians:* They have Summer and Winter at the ſame Times with thoſe of the Place aſſumed; but the Times of the Day are different, the Mid-day of the one being the Mid-night of the other.

3. That Place, which has the ſame Latitude, on the other Side of the Equator, and is 180 Degrees different in Longitude. This Place is diametrically oppoſite to the Place aſſumed: Its Inhabitants are called *Antipodes*, and their Seaſons of the Year, as well as Times of the Day, are totally oppoſite.

The Horizon is that great Circle which divides the upper or viſible Hemiſphere of the World, from the lower or inviſible, the Eye of the Spectator being always in the Centre of the Horizon. Hence every particular Place on the terraqueous Globe hath a different Horizon; and conſequently a Traveller, proceeding in any Direction, is continually changing his Horizon.

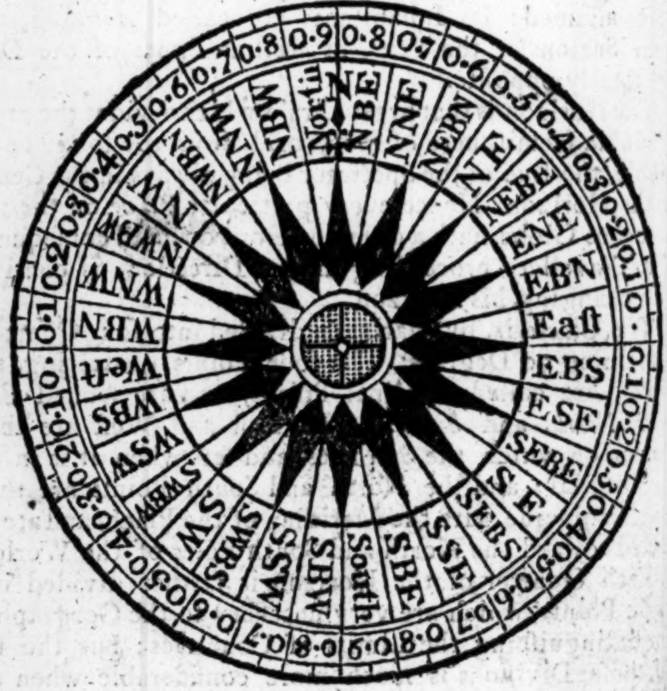
The Circle is, by Mariners, divided into four Quarters, containing 90 Degrees: The four Points quartering this circle, are called Cardinal Points, and are named *Eaſt*, *Weſt*, *North*, and *South:* The Eaſt and Weſt are thoſe Points on which the Sun riſes and ſets when it is in the Equinoctial; and the North and South Points are thoſe which coincide with the Meridian of the Place, and are directed toward the North and South Poles of the World.

Each Quarter of the Horizon is farther divided into eight Points, which are very neceſſary to the Geographer, for diſtinguiſhing the Limits of Countries; but the Uſe of thoſe Diviſions is much more conſiderable when applied to the *Mariner's Compaſs.*

Before the Invention of this excellent and moſt uſeful Inſtrument, it was uſual, in long Voyages, to ſail by, or keep along the Coaſt, or at leaſt to have it in ſight; as is manifeſt and plainly evident, by the Voyages of St. *Paul*, *Acts* xx. 13. and xxviii. 2. which made their Voyages long, and very dangerous, by being ſo near the ſhore. But now, by the help of a Needle, touched by the Magnet or Load-ſtone, which, by a wonderful and hidden Quality, inclines its Point always Northerly; the ingenious Mariner is directed his proper Courſe of Sailing through the vaſt Ocean, and unfathomable Depths, to his intended Port; and, if the Wind is favourable, can ſail near 333 Leagues, or 1000 Miles, in a Week, through the darkeſt Weather, or darkeſt Night, when neither Land, Moon, nor Stars, are to be ſeen, which before were the only Guide; and, if not ſeen, the Sailors were at a great Loſs, and expoſed to the moſt imminent Danger.

Behold the Figure or Repreſentation of the ſaid Compaſs, with the Cardinal, and other Points, as followeth:

*The Mariner's Compaſs.*



The Compaſs in the preceding Page is a Repreſentation of the Horizon on a circular Piece of Paper called a Card, which Card being properly fixed to a Piece of Steel called the Needle, and placed ſo as to turn freely round a Pin that ſupports it, will ſhew the Poſition of the Meridian, and other Points; and conſequently towards which of them the ſhip ſails.

*Note*, The Letters *NBE*, *NNE*, *NEBN*, &c. are to be read North by Eaſt, North North Eaſt, North Eaſt by North, *&c.*

A Climate is a Space of the terraqueous Globe contained between two ſuch Parallels of Latitude, that the Length of the longeſt Day in the one exceeds that in the other by half an Hour.

There are ſixty Climates, thirty to the North, and thirty to the South of the Equator; twenty-four of each thirty being ſituate between the Equator and the Polar Circle, differ in the Length of their longeſt Day by twenty-four Hours; but in the remaining ſix, between the Polar Circles and Poles, the Differences of the Lengths of the longeſt Day are each a Month.

*A Table of the Climates between the Equator and the Polar Circles.*

| Climate. | Longeſt Day. | Begins Latitude. | Ends Latitude. | Breadth. |
|---|---|---|---|---|
| 1 | 12½ Ho. | 0° - 0′ | 8° - 34′ | 8° - 34′ |
| 2 | 13 | 8 - 34 | 16 - 43 | 8 - 09 |
| 3 | 13½ | 16 - 43 | 24 - 11 | 7 - 28 |
| 4 | 14 | 24 - 11 | 30 - 45 | 6 - 34 |
| 5 | 14½ | 30 - 45 | 36 - 30 | 5 - 45 |
| 6 | 15 | 36 - 30 | 41 - 22 | 4 - 52 |
| 7 | 15½ | 41 - 22 | 41 - 31 | 4 - 09 |
| 8 | 16 | 45 - 31 | 49 - 01 | 3 - 30 |
| 9 | 16½ | 49 - 01 | 51 - 58 | 2 - 57 |
| 10 | 17 | 51 - 58 | 54 - 29 | 2 - 31 |
| 11 | 17½ | 54 - 29 | 56 - 37 | 2 - 08 |
| 12 | 18 | 56 - 37 | 58 - 26 | 1 - 49 |
| 13 | 18½ | 58 - 26 | 59 - 59 | 1 - 33 |
| 14 | 19 | 59 - 59 | 61 - 18 | 1 - 19 |
| 15 | 19½ | 61 - 18 | 62 - 25 | 1 - 07 |

| Climate. | Longeſt Day. | Begins Latitude. | Ends Latitude. | Breadth. |
|---|---|---|---|---|
| 16 | 20 Ho. | 62° - 25′ | 63° - 21′ | 0° - 5′ |
| 17 | 20½ | 63 - 21 | 64 - 09 | 0 - 48 |
| 18 | 21 | 64 - 09 | 64 - 49 | 0 - 40 |
| 19 | 21½ | 64 - 49 | 65 - 21 | 0 - 32 |
| 20 | 22 | 65 - 21 | 65 - 45 | 0 - 24 |
| 21 | 22½ | 65 - 45 | 66 - 06 | 0 - 21 |
| 22 | 23 | 66 - 06 | 66 - 20 | 0 - 14 |
| 23 | 23½ | 66 - 20 | 66 - 28 | 0 - 08 |
| 24 | 24 | 66 - 28 | 66 - 31 | 0 - 03 |

### *A Table of the Climates between the Polar Circles and the Poles.*

| Climate. | Longeſt Day. | Begins Latitude. | Ends Latitude. | Breadth. |
|---|---|---|---|---|
| 25 | 1 Month | 66° - 31′ | 67° - 21′ | 8°- 50′ |
| 26 | 2 | 67 - 21 | 69 - 48 | 2 - 27 |
| 27 | 3 | 69 - 48 | 73 - 37 | 3 - 49 |
| 28 | 4 | 73 - 37 | 78 - 30 | 4 - 53 |
| 29 | 5 | 78 - 30 | 84 - 05 | 5 - 35 |
| 30 | 9 | 84 - 05 | 90 - 90 | 5 - 55 |

The terraqueous Globe, or Globe of the Earth and Water, is divided by Nature, into Continents, Iſlands, Peninſulas, Iſthmuſſes, Mountains, Promontories or Capes, Hills and Vallies; Oceans, Seas, Lakes, Gulphs or Bays, Streights, Ports or Harbours, and Rivers; Rocks, Shelves, Banks, Marſhes and Bogs.

A Continent, called ſometimes the Main-land, is a large Tract of Land, containing ſeveral contiguous Countries, Empires, Kingdoms, or States.

An Iſland is a Piece of Land wholly ſurrounded by the Ocean, Sea, or other Water, and ſo divided from the Continent.

A Peninſula (that is to ſay, *almoſt an Iſland)* is a Piece of Land, encompaſſed by Water, except on one Side, where it is joined to the Continent, or other Land.

An Iſthmus is that neck, or narrow Piece of Land, that joins a Peninſula to the Continent.

A Mountain is a Part of the Earth, which is conſiderably higher, or more elevated than other Lands near it.

A Promontory is a Mountain running out into the Sea, the extremity of which is called a Cape or Headland.

A Hill is a leſſer kind of Mountain; and a Valley is that Land which is ſituate at the Bottom of a Mountain or Hill, or between two or more ſuch.

The Ocean is a vaſt Body of Salt Water, which ſeparates ſome of the Continents, and waſhes their borders or Shores.

A Sea is a Branch of the Ocean flowing between ſome Parts of the Continents, or ſeparating Iſlands from them.

A Lake is a Body of Water every where ſurrounded by the Land.

A Gulph or Bay is a Part of the Ocean or Sea contained between two Shores, and is encompaſſed by the Land, except on one Side, where it communicates with the other Waters.

A Strait is a narrow Paſſage whereby Seas, Gulphs, and Bays, communicate with the Ocean, or with one another.

A Port or Harbour is a Part of the Ocean or Sea ſo incloſed by the Land, that Ships may ride in ſafety therein.

A River is a running Water, deſcending in a narrow Channel from the Mountains, or other high Land, and emptying itſelf into ſome Ocean, Sea, Lake, or other River.

Rocks are great Stones; Shelves and Banks are Eminences conſiſting of Stones, Sands, or other Matter, which obſtruct the Paſſage of Ships at Sea, and often prove fatal to thoſe who do not keep clear of them.

Marſhes are Lands lying low, which are liable to be overflowed by the Sea or Rivers; and Bogs are Mixtures of Land and Water, over or among which it is dangerous to attempt a Paſſage.

The known Parts of the Earth are commonly divided into four Parts, *viz. Europe, Aſia, Africa*, and *America*; the firſt three were known to the Ancients, and are for that Reaſon called the Old World: the fourth was diſcovered about 300 Years ago, and therefore called the New World.

The Lands which lie towards the North and South Poles are very little known; that towards the North Pole is called *Terra Artica*, and that towards the South Pole *Terra Antarctica*, or *Terra Auſtralis Incognita*; the latter is ſuppoſed by ſome, to be nearly as big as *Europe*, *Aſia*, and *Africa*.

The Ocean aſſumes different Names, in different Parts of the Earth; and the Seas, Gulphs and Bays are named moſtly from the Lands to which they adjoin; it is thought therefore moſt convenient in this ſhort Sketch, to deſcribe the Land, and Waters together; and firſt of

## EUROPE,

### *And the adjacent Waters.*

*Europe* is bounded on the North by the northern or frozen Ocean; on the Weſt by the North *Atlantic* or weſtern Ocean, which ſeparates it from *America*; on the South by the *Mediterranean* Sea, ſeparating it from *Africa*; and on the Eaſt, by *Aſia*, to which it joins, without any viſible Limit, towards the northern Parts; but on the ſouthern the River *Tanis*, the *Palus Mætis*, or Sea *Della Zabaccha*, the Straits of *Caffa*, the *Euxine*, or *Black Sea*, the Straits of *Conſtantinople*, the Sea of *Marmora*, the Sraits of the *Dardanelli*, and the *Archipelago*, ſerve to ſeparate.

The Dimenſions of *Europe* may be partly conceived by the Meaſures following: *Conſtantinople*, the Capital of *Turkey*, (ſituate in Latitude 41° N. Longitude 28 58 E.) bears from Cape *St. Vincent*, the South Weſt Point of Land in *Portugal*, (ſituate in Lat. 36° 4′ N. Long. 8 12 W.) N. 81 48 E. being 178 Geographical Miles * diſtant therefrom.

Cape *Mala*, the Southern Part of *Turkey* (in Lat. 37° 20′ N. Long. 24 97 E.) bears from the North Cape (in Lat. 71° 27′ N. Long. 26 36 E.) S. 2, 15 W. Diſtance 2058 Miles.

*Europe* contains the following Empires, Kingdoms, Regions or States, *viz. Spain*, *Portugal*, *France*, *Italy*, *Turkey*, *Great Britain*, the *Netherlands*, *Germany*, *Hungary*, *Poland*, *Denmark*, *Sweden* and *Muſcovy*.

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* *Geographical Miles may be reduced to* Engliſh *Miles, by adding to their Number one ſixth of the ſame, thus* 1700 *Geographical Miles are equal to* 1700 *and* 283, *or* 1983 Engliſh *Miles.*

## *Of* SPAIN *and* PORTUGAL.

*Spain* and *Portugal* are ſurrounded by the Sea on three Sides; on the South and South-eaſt by the *Mediterranean*, which communicates with the weſtern or *Atlantic* Ocean, by the Straits of *Gibraltar*; on the Weſt by the ſaid Ocean; and on the North, by the ſame or a Part thereof called the *Bay of Biſcay*: On the North-eaſt by the *Pyrenean* Mountains, (which reaching from the *Mediterranean* to the *Bay of Biſcay*) ſeparate it from France.

*Portugal* is now a Kingdom, ſeparate from *Spain*, to which it was heretofore ſubject: It is ſituate on the Ocean which waſhes it on the Weſt and South; it has *Gallicia* on the North, and borders upon *Leon*, *Old Caſtile*, *New Caſtile* and *Andaluſia*, on the Weſt; it is hardly 300 Miles in Length from North to South, and about 100 in Breadth. The Capital City is *Liſbon*, which was till lately in a ruinous Condition, having been almoſt totally deſtroyed by an Earthquake, and a Fire which ſucceeded it in *November* 1755. The City of *Oporto* is alſo a Place of great Trade.

Moſt of the other Provinces of *Spain* were all formerly ſeparate Kingdoms; ſuch were *Andaluſia*, in which *Gibraltar* is ſituated, as are the Cities of *Seville* and *Cadiz*; *Granada* within the *Straits*, the principal City has the ſame Name; and on the *Mediterranean* are ſituated the Ports of *Malaga* and *Almeria*, *Murcia* more Eaſtward in the *Mediterranean*, in which beſides a City of the ſame Name, is the City and Port of *Carthagena*: *Valencia*, North eaſtward of *Murcia*; this has a City and Sea-port of the ſame Name, and another Port of great Trade called *Alicant*.

In the Inland Parts are Kingdoms of *Old Caſtile*, *New-Caſtile*, and *Leon*, and near the Confines of France, thoſe of *Arragon* and *Navarre*: The principal Cities of *Old Caſtile*, are *Burgos*, and *Valadolid*; of *New Caſtile*, *Madrid*, the King's Reſidence, and *Toledo*; of *Leon*, *Salamanca*, and *Leon*; of *Arragon Saragoſſa*; and of *Navarre*, *Pampelona*, and *Eſtella*.

The Kingdom of *Gallicia* is ſituate on the Ocean in the North Weſt Part of *Spain*; its principal Cities are *Compoſtella*, and *Corunna* or the *Groyne*, which is a Sea-port. The Principality of *Aſturias* gives Title to the King of *Spain's* eldeſt ſon, it is ſituated eaſtward on the Bay of

*Biſcay*; the principal City is called *Oviedo*; the Province of *Biſcay*, ſtill more eaſtward, lies on the Bay of that Name, and has two Ports of conſequence, *Bilboa*, and *St. Sebaſtian*.

*Laſtly*, The principality of *Catalonia* is ſituated on the *Mediterranean*, and is the moſt eaſtern province of *Spain*; in this is the city and port of *Barcelona*, which is not inferior to any of the above-named. Not far from which are the *Balearic* Iſles, called *Majorca*, *Minorca*, and *Ivica*.

Proceeding eaſtward along the *Mediterranean* Sea is the Republic* of *France*, which is bounded on the eaſt by *Italy* and *Germany*, on the North by the *Netherlands* and the *Engliſh* Channel, on the Weſt by the Sea of *Biſcay*, and on the South by the *Pyrennees*, which ſeparate it from *Spain*, and a Part of the *Mediterranean* Sea.

*France* conſiſts of twelve Provinces; the Southern are *Guienne* and *Gaſcony*, whoſe chief town is *Bourdeaux*; *Languedoc*, whoſe capital is *Thoulouſe*; *Dauphine*, whoſe principal city is *Grenoble*; and *Provence*, whoſe capital is *Aix*; this Province has two very conſiderable Sea-ports called *Toulon* and *Marſeilles*.

More northerly are the Provinces of *Bretaigne*, *Orleannois*, *Burgoigne*, and *Lyons*; and ſtill more northward are *Normandy*, the Iſle of *France*, *Champaigne*, and *Picardy*, whoſe chief towns are *Rouen*, *Paris*, (the capital of the kingdom) *Troyes*, and *Amiens*.

Although the Provinces of *France* have not the ſuperb Titles of Kingdoms, as thoſe of *Spain* have, yet ſome of them are more extenſive, rich and populous, than ſome of thoſe kingdoms.

*Italy* is divided from *France* on the Weſt by the river *Var* and part of the *Alps*; from *Germany* on the North, by the ſame Mountains called the *Alps*; and is every where elſe ſurrounded by the *Mediterranean* Sea, and the Gulph of *Venice*, which is a branch thereof.

This country is divided into a great many territories governed in different manners.

The Dukedom of *Savoy*, ſituated partly among the *Alps*, the Capital of which is *Chamberry*; and the principality of *Piedmont*, whoſe Capital is *Turin*, are ſubject to the King of *Sardinia*, the Duchies of *Milan* and *Mantua*, whoſe capitals bear the ſame names, are ſubject to the Queen of *Hungary*; the Duchy of *Monſerrat*, whoſe capital is called *Cajal*, and thoſe of *Parma* and *Modena*, having capitals of the ſame name, are governed by their own Dukes; *Venice*, *Genoa*, *Lucca*, and *St. Mirino*, are the capitals of four Republics, called by thoſe names; *Trent* is governed by its Biſhop; *Rome* and its dependencies by the Pope; the Grand Duchy of *Tuſcany* (the capital of which is *Florence*) is ſubject to the brother of the preſent Emperor of *Germany* and *Naples*, the capital of a kingdom, ſituate at the Southern extremity, together with the Iſland of *Sicily*, from which it is divided by a narrow Strait, are ſubject to the ſame king. The chief city of *Sicily* is called *Paleormo*.

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* The Geography of France is given according to its Boundaries, previous to the Revolution.

There are two other large Iſlands, *Sardinia* (whoſe Capital is *Cagliari*) ſubject to its King, and *Corſica*, (whoſe Capital is *Baſtia*) at preſent ſubject to *France*; alſo a ſmall one to the South of *Sicily*, called *Malta*, ſubject to the Knights of Malta.

More to the eaſtward is *Turkey* in *Europe*, which conſiſts of many Provinces; *Conſtantinople* in the eaſtern part thereof, being the reſidence of the Grand Signor, the Sovereign of this Empire.

The names of thoſe provinces, and their capital cities, follow:

| Provinces. | Chief Cities. |
|---|---|
| *Dalmatia*, | *Spalatro*, |
| *Baſnia*, | *Belgrade*, |
| *Servia*, | *Semandria*, |
| *Tranſylvania*, | *Hermanſtat*, |
| *Walachia*, | *Tergowick*, |
| *Moldavia*, | *Sackzow*, |
| *Bulgaria*, | *Sophia*, |
| *Crim. Tartary*, | *Precop*, |
| *Romanea*, | *Conſtantinople*, |
| *Grecia*, | *Sotoniki*. |

To theſe may be added the Iſlands of the *Archipelago*, which are very numerous.

*Great Britain* is a large Iſland, having divers leſſer ones dependent on it; it conſiſted 71 Years ago of two diſtinct kingdoms (under one Sovereign) called *England*

*land* and *Scotland*; and as this work is publiſhed in the former of them, it is thought convenient to be more particular in the Deſcription thereof than we are with regard to other Countries; we ſhall therefore give the following

## Account of the ſeveral Counties of *England* and *Wales*, with their Produce, Market Towns, and Market Days, &c.

*Note*, *m* ſtands for *Monday*, *tu* for *Tueſday*, *w* for *Wedneſday*, *th* for *Thurſday*, *f* for *Friday*, and *ſ* for *Saturday*.

### *Berkſhire*

IS ſuppoſed to contain about 527,000 Acres, is 120 miles in circumference, hath plenty of Corn, Cattle, Wool, and Wood, (eſpecially Oak) and is accommodated with Water Carriage, by the very fine Rivers of *Thames* and *Kennet*;

*And hath theſe Market Towns*, viz.

Reading the Shire Town, Market Day on Saturday.

Abingdon, *m* and *ſ*
Windſor, *ſ*
Wallingford, *tu* and *f*
Maidenhead, *w*
Hungerford, *w*
Newberry, *th*
Farringdon, *tu*
Wantage, *f*
Eaſt Iſley, *w*
Oakingham, *th*

### *Buckinghamſhire*

Is an inland County as well as *Berkſhire*: it contains about 441,000 Acres, is 138 miles in circumference, abounds in Corn, Cattle, and is very conſiderable for Wool. The principal Rivers in this Shire are *Tame*, *Ouze*, and *Coln*.

*Market Towns.*

Buckingham, *f*
Ayleſbury, *ſ*
High Wickham, *f*
Marlow, *ſ*
Stony Stratford, *f*
Oundle, *m*
Beaconsfield, *th*
Cheſham, *w*
Wendover, *th*
Amerſham, *tu*
Newportpagnel, *ſ*
Colebrook, *w*
Riſborough, *f*
Invingho, *f*
Winſlow, *th*

### *Bedfordſhire*

Contains about 260,000 Acres, is 73 Miles in Circumference, well ſtored with Corn and Cattle, and famous for Fuller's Earth, &c.

#### *Market Towns.*

Bedford; *th* and *ſ*
Dunſtable, *w*
Wooburn, *f*
Ampton Hill, *th*
Leighton, *m*
Luton, *m*
Shefford, *f*
Biggleſwade, *th*
Potton, *ſ*
Tuddington, *ſ*

### *Cambridgeſhire*

Is an Inland County, contains about 570,000 Acres, is 130 Miles in Circumference, and affords plenty of Corn, Cattle, and Wild-Fowl. *Cambridge* is the Shire Town, and remarkable for a famous Univerſity containing 12 Colleges and 4 Halls, all well endowed, and are as followeth, *viz.*

| COLLEGES.<br>When founded. | By whom founded. |
|---|---|
| 1284 *Peter Houſe* - - | Hugh de Bathan, Biſhop of Ely. |
| 1346 *Corpus Chriſti,* or *Bennet* | Henry of Monmouth, Duke of Lancaſter. |
| 1348 *Gonvil* and *Caius,* | So called from its ſeveral Founders. |
| 1441 *King's* - - - - | Henry VI. |
| 1448 *Queen's* - - - - | Margaret his Queen. |
| 1497 *Jeſus* - - - - | John Alcocke, L.L.D. Biſhop of Ely. |
| 1506 *Chriſt's* - - - - | Margaret Counteſs of Richmond. |
| 1506 *St. John's* - - - | Ditto. |
| 1542 *Magdalen* - - - | Edward Strafford, D. of Buckingham. |
| 1546 *Trinity* - - - - | King Henry VIII. |
| 1584 *Emanuel* - - - | Sir Walter Mildmay, |
| 1598 *Sidney Suſſex* - - | Frances Sidney, Counteſs of Suſſex. |
| HALLS. | |
| 1343 *Clare* - - - - | Richard Badew. |
| 1347 *Pembroke* - - - | Mary, Counteſs of Pembroke. |
| 1353 *Trinity* - - - - | William Bateman, Bp. of Norwich. |
| 1549 *Catherine* - - - | Robert Wood, the Chancellor. |

*Market Towns.*

Cambride, *ſ*
Ely, *tu*
Caxton, *tu*
Linton, *th*
New-Market, *tu*
Merche, *ſ.*
Wiſbich, *ſ.*
Royſton, *w.*
Soham, *ſ.*

### *Cheſhire*

Is a maritime or Sea County, containing 720,000 Acres, and is in Circumference about 118 miles. Cheeſe and Salt are the principal Commodities; for the firſt, no place in the World equals it; and for the latter, if there was but a ſufficient Quantity, there would be no occaſion for Voyages to the Iſle of *May*.

*Market Towns.*

Cheſter, *w* and *ſ*
Congleton, *ſ*
Namptwich, *ſ*
Middlewich, *f*
Northwich, *f*
Macclesfield, *m*
Frodſham, *w*
Stockport, *ſ*
Sandwich, *th*
Alſtringham, *tu*
Malpas, *m*
Knotsford, *f*

### *Cornwall*

Is a maritime County in the moſt Weſtern Part of the Kingdom, conſiſting of about 960,000 Acres, and is 150 Miles in Circumference. The chiefeſt Commodities are Tin, and Copper, particularly the former; it alſo affords great plenty of Wild Fowl, eſpecially Woodcocks in the ſeaſon: It likewiſe yields great quantities of Samphire, Eringo, fine Slate and Marble; above all the reſt, vaſt Quantities of Fiſh, which are yearly exported to *France*, *Spain*, and other foreign Countries.

*Market Towns.*

Launceſton is the ch. Town *ſ*
Liſkeard, *ſ*
Leſtwithiel, *f*
Truro, *w* and *ſ*
Bodmin, *ſ*
Helſton, *ſ*
Padſtow, *ſ*
Cachelford, *f*
Crampound, *ſ*
Penryn, *w f* and *ſ*
Tregony, *ſ*
St. Ives, *w* and *f*
Penzance, *th*
Fowey, *ſ*
St. German, *f*
St. Columbe, *th*
Falmouth, *th*
Market-Jew, *th*

### *Cumberland*

Is alſo a maritime County, bounded northward with *Scotland*, and Weſtward with the *Iriſh* Sea; it contains about 1,040,000 Acres, and is in Circumference 168 Miles, it is a fruitful Country, affording good paſture on the Hills, and good Corn, in Plenty, in the Vallies: Fiſh and Wild Fowl are very plentiful, and Coals in abundance; likewiſe large Mines of Lead and Copper, which are both very good in their kind.

*Market Towns.*

- Carliſle is the chief, *ſ*
- Cockermouth, *tu*
- Whitehaven, *th*
- Penrith, *tu*
- Keſwick, *ſ*
- Brampton, *tu*
- Holm, *ſ*
- Egremont, *f*
- Kirk-Oſwald, *th*
- Longtown, *th*
- Ravenglaſs, *ſ*
- Wigtown, *tu*

### *Derbyſhire*

Is an Inland County 120 Miles in Circumference, and contains about 680,000 Acres, affords good Store of Corn and Wood; likewiſe conſiderable Quantities of Free-ſtone and Marble, Coal and Lead Mines in Abundance; alſo it yields Chryſtal and Alabaſter.

*Market Towns.*

- The County Town is Derby, *ſ*
- Cheſterfield, *ſ*
- Workſworth, *tu*
- Bolſover, *f*
- Aſhburn, *f*
- Alfreton, *m*
- Bakewell, *m*
- Dronsfield, *th*
- Fiddlewall, *w*

### *Devonſhire*

Is a maritime County about 200 Miles in Circumference and contains about 680,000 Acres; it lies on the Weſt of *England*, and joins to *Cornwall*, having the Sea on the North and South; it affords great Plenty of Corn, Wool, Fowls and Fiſh, as alſo Lead and Tin Mines; but the principal Manufactures are Kerſies, Serges, and Lace.

*Market Towns.*

- Exeter is the Capital, *w* and *ſ*
- Barnſtable, *f*
- Honiton, *ſ*
- Oakhampton, *f*
- Plimpton, *ſ*
- Taviſtock, *ſ*
- Tiverton, *tu*
- Plymouth, *m* and *tu*
- Totneſs, *ſ*
- Aſhburton, *ſ*
- Biddeford, *tu*
- Torrington, *ſ*

Axminſter, *ſ*
Culliton, *th*
Dodbrook, *w*
Autrey, *tu*
Cuddee, *ſ*
Hatherleo, *tu*
Moreton, *ſ*
Kingſbridge, *f*

### *Dorſetſhire*

Is a County exceeding pleaſant and fruitful, and lies upon the Channel, being 150 Miles in Circumference, and contains about 772,000 Acres, yielding great Plenty of Corn, Cattle, Wool, Fiſh and Wild Fowl; and it alſo affords Abundance of Hemp, Free-ſtone and marble.

#### *Market Towns.*

Dorcheſter is the County-Town, *ſ*
Weymouth, *tu* and *f*
Melcomb-Regis, *tu* and *f*
Shaftſbury, *ſ*
Pool, *m* and *tu*
Wareham, *ſ*
Corf-caſtle, *tu*
Cranbourn, *w*
Blanford, *ſ*
Abbotſbury, *th*
Cerne, *w*
Frampton, *th*
Sherborne, *tu* and *ſ*
Wimborn, *f*
Sturminſter, *th*

### *Durham*

Is a County Palatine, and lies very far in the North of the Kingdom, the Air very cold, and the Ground not ſo fruitful as in the ſouthern parts: 'Tis 107 Miles in Circumference, and contains about 610,000 Acres; its chief Commodities are Coal, Iron, and Lead.

#### *Market Towns.*

Durham is the principal, *ſ*
Aukland, *th*
Darlington, *m*
Sunderland, *ſ*
Bernard's Caſtle, *w*

### *Eſſex*

Is a County bounded by the Sea, and lies in the Eaſtern Part of *England*; is 146 Miles in Circumference, and contains 1,240,000 Acres; the Soil yields Plenty of Corn, Cattle and Wood: at Wallden it affords great Store of Saffron, and the beſt in the whole World, the *Spaniſh* being nothing in Compariſon of it.

#### *Market Towns.*

Chelmsford is the County-Town, *f*
Harwich, *tu*
Malden, *ſ*
Colcheſter, *ſ*
Barking, *ſ*
Hatfield, *ſ*
Rumford, *w*

Wallden, *ſ*
Epping, *th* and *ſ*
Braintree, *w*
Billericay, *th*
Brentwood, *th*
Dunmore, *ſ*
Coggeſhal, *ſ*
Grayes, *th*
Haſtead, *f*
Horndon, *ſ*
Raleigh, *ſ*
Manning-tree, *tu*
Waltham-Abbey, *tu*
Troxtead, *ſ*
Sudbury, *ſ*

### *Glouceſterſhire*

Is a County exceeding fruitful and delightful; and, taken altogether, one of the pleaſanteſt Parts of the kingdom: It contains about 800,000 Acres, affords ſome of the beſt Cheeſe in the Nation, and Wool hardly inferior to *Spaniſh*. It alſo abounds in Wood, Iron, Steel, and Salmon: but its chiefeſt Manufacture is the Woollen, which is very extenſive.

*Market Towns.*

Glouceſter is the County-Town, *w* and *f*
Cirenceſter, *m* and *f*
Tewkſbury, *f*
Blackley, *w*
Durſley, *th*
Campden, *w*
Newnham, *f*
Stroud, *f*
Cheltenham, *th*
Lechlade, *tu*
Newent, *f*
Sudbury, *th*
Pauſwick, *tu*
Stow, *th*
Tedbury, *w*
Wickmore, *m*
Thornbury, *f*
Winchcomb, *ſ*
Wotton, *f*

### *Hampſhire,*

Or the County of *Southampton*, borders upon the Channel, being a pleaſant, healthful and fruitful Country, about 100 Miles in Circumference, and contains about 1,312,500 Acres, it affords vaſt plenty of Corn, Graſs, Sheep and Wool, and particularly famous for Hogs and Honey, both of which are moſt excellent in their Kind.

*Market Towns.*

Southampton, the County-Town, *tu* and *ſ*
Wincheſter, *w* and *ſ*
Portſmouth, *th* and *ſ*
Andover, *ſ*
Lymington, *ſ*
Alton, *ſ*
Baſingſtoke, *w*
Kingſclear, *tu*
Ringwood, *w*
Odiham, *ſ*
Rumſey, *ſ*
Alceſtan, *th*

To this county belongs the *Iſle of Wight*, of a very conſiderable Extent, the principal Town *Newport.*

### *Hertfordſhire*

Is a very fine incloſed County, the Land ſomewhat ſtony, but very fruitful, affording great Plenty of Corn, and is very remarkable for good Malt; it is 130 Miles in Circuit, contains about 451,023 Acres, and hath an excellent Air, *&c.*

*Market Towns.*

Hertford is the County Town, *ſ*
St. Albans, *ſ*
Barnet, *m*
Ware, *tu*
Berkhampſtead, *m*
Rickmanſworth, *ſ*
Hatfield, *th*

Buntingford, *m*
Baldock, *th*
Hitching, *th*
Hodſdon, *th*
Stevenage, *f*
Tring, *f*
Watford, *tu*
Hempſtead, *th*

### *Herefordſhire*

Is an Inland County, of a good Soil, and healthful Air, 100 Miles in Circuit, and contains about 660,000 Acres: It affords plenty of Wood, Wheat, Salmon and Cyder, which are generally eſteemed the beſt in the Kingdom.

*Market Towns.*

Hereford is the Capital *w. f, ſ.*
Lempſter, *f*

Weobly, *th*
Kyneton, *w*
Roſs, *th*

Pemb. *tu*
Ledbury, *tu*
Bromyard, *m*

### *Huntingdonſhire*

Is a ſmall Inland County of about 67 Miles in Circuit, and contains about 240,000 Acres: it is an open Country but generally very fertile and delightful, abounding in Corn and Cattle, which are its chiefeſt Commodities.

*Market Towns.*

Huntingdon the Chief, *ſ*
St. Ives, *m*
Kimbolton, *f*

St. Neot's, *th*
Ramſey, *w*
Yaxley, *tu*

### *Kent*

Is a Sea County on the Eaſt Part of the Channel; it is 160 Miles in Circumference, and contains about 1,248,000 Acres, being diſtinguiſhed into three parts, *viz.* the Marſhy, as *Romney* Marſh, *&c.* the Downs, and the Middle or Woody Part. It affords Plenty of Corn and good Paſture, and the beſt Cherries and Pippins in the Kingdom.

*Market*

### *-Market Towns.*

Canterbury (famous for its Cathedral) is the Capital, *w* and *f*
Rocheſter, *f*
Maidſtone, *th*
Dover, *w* and *f*
Sandwich, *w* and *ſ*
Romney, *th*
Smarden, *f*
Hithe, *ſ*
Bromley, *th*
Cranbrook, *ſ*
Cray, *w*
Dartford, *ſ*
Eltham, *m*
Feverſham, *w* and *ſ*
Folkſtone, *th*
Graveſend *w* and *ſ*
Lenham, *tu*
Lidd, *th*
Sevenoak, *ſ*
Tenterden, *f*
Malling, *ſ*
Milton, *ſ*
Tunbridge, *ſ*
Weſtram, *w*
Woolwich, *f*
Wrotham, *tu*
Wye, *th*

## *Suſſex*

Is a Maritime County, lying upon the Channel between *Kent* and *Hampſhire*, containing 1,140,000 Acres, and is 158 Miles in Circumference. The County is both fertile and healthful, and is moſt exceedingly pleaſant; the South Downs being the moſt delectable, or delightful Part of the whole Kingdom; and as I know them, I alledge them to have the moſt beautiful Variety, and the pleaſanteſt Proſpect that can be in the whole Culture of Nature; the Soil being exceedingly rich, occaſioned by the numerous Flocks of Sheep there kept; and therefore produce wonderful Crops of Corn of all Sorts: It hath alſo the fineſt Woods and Rivers, and affords the beſt Game for Hunting, Fiſhing, and Fowling.

### *Market Towns.*

Chicheſter is the chief, *w* and *ſ*
Eaſt Grinſtead, *th*
Haſtings, *w* and *ſ*
Rye, *w* and *f*
Arundel, *w* and *ſ*
Horſham, *ſ*
Midhurſt, *th*
Steyning, *w*
Petworth, *w*
Battle, *th*
Haliſham, *ſ*
Brighthelmſton, *th*
Cuckfield, *f*

## *Lancaſhire*

Is a Sea-coaſt County bounded on the Eaſt by the *Iriſh* Sea: it is 150 Miles in Circuit, and contains 1,150,000 Acres, the Air is very wholeſome, and the People live to an advanced Age. The Soil is very good, and yields Corn of all Sorts, particularly Oats, which are looked upon as the beſt in the Kingdom. It affords alſo Plenty of Pit-coal, and great Quantities of excellent Fiſh of all Sorts.

*Market Towns.*

Lancaſter is the County Town, ſ
Clitherto, ſ
Liverpool, f
Preſton, *w f* and ſ
Wigan, *m* and f
Mancheſter, ſ
Warrington, *w*

Ulverſton, *th*
Bolton, *m*
Blackbourn, *m*
Cartmel, *m*
Coln, *w*
Bury, *th*
Charnley, *tu*
Dalton, ſ

Rochdale, *tu*
Howſtead, *m*
Hoſtingdon, *w*
Gariſtrong, *th*
Kirkham, *tu*
Hornby, *m*
Ormſkirk, *tu*
Poulton, *m*

### *Leiceſterſhire*

Is a fine pleaſant inland County, 96 Miles in Circuit, contains about 560,000 Acres, abounds with Corn and good Paſture, and is very remarkable for Beans and Peas for Horſes, which thrive there beſt of any County in *England*; it is alſo eminent for large Sheep, which produce Abundance of Wool, and the longeſt in the Kingdom.

*Market Towns.*

Leiceſter is the County Town, *m* and ſ
Aſhby de la Zouch, ſ
Bolſworth, *w*
Harborough, *tu*
Hallaton, *th*

Hinkly, *m*
Lutterworth, *th*
Loughborough, *th*
Milton, *tu*
Mountſorrel, *m*
Waltham, *w* and *th*

### *Lincolnſhire*

Is a Maritime County, Part bordering on the *German* Sea, and contains about 1,740,000 Acres, being 143 Miles in Circuit: the weſtern Parts are good and fruitful, having plenty of Graſs, and breed the largeſt Oxen in the Kingdom, but the eaſtern Parts are marſhy, though well ſtored with Wild Fowl.

*Market Towns.*

Lincoln is the Capital, ſ
Boſton, *w* and ſ
Grantham, ſ
Stamford, *m* and f
Grimſby, *w*
Gainſborough, *tu*
Bolingbrook, *tu*
Spalding, *tu*

Stanton, *m*
Binbrook, *w*
Alford, *tu*
Burton, *m*
Barton, *m*
Kirton, *th*
Bourn, ſ
Tatterſhall, f

Womsfleet, ſ
Dunnington, ſ
Falkingham, *th*
Holbeck, *th*
Horncaſtle, ſ
Louthe, *w* and ſ
Sleeford, *m*
Spilſby, *m*

### *Middleſex*

Is the Metropolis of the Kingdom, an inland County, having the Soil fertile by Improvement, and the Air as ſweet and wholeſome as any in the Kingdom: the *Thame* parts it from the County of *Surry*, and is, on moſt accounts, the fineſt River in the World.

*Market Towns.*

*London*, the Metropolis, hath Markets for every Day in the Week
Weſtminſter, *m w* and *f*
Brentford, *th*
Stains, *f*
Uxbridge, *th*
Enfield, *ſ*
Edgeworth, *th*

### *Monmouthſhire*

Lies upon the Borders of *Wales*, was formerly reckoned a part of it, but is numbered among the Engliſh Counties: It is accommodated by the famous River *Severn*, the ſecond in the Kingdom; and contains 34,000 Acres, being 80 Miles in Circuit. This County is healthful, abounding with Corn, Cattle, Salmon and Trout.

*Market Towns.*

Monmouth, the principal, *ſ*
Abergavenny, *tu*
Cærleon, *tu*
Chepſtow, *tu*
Newport, *ſ*
Pontypool, *f*
Uſke, *m* and *f*

### *Norfolk*

Is a large County, bordering on the Northern Coaſt, upon the German Sea: It is 180 Miles in Circuit, and contains 1,148,000 Acres. The Soil is different; in ſome Places fertile, in others ſandy, and in ſome deep and heavy. Its principal Commodities are Corn, Wool, Honey, and ſome Saffron; but chiefly Stuffs and Herrings, the firſt from *Norwich*, and the latter from *Yarmouth*. Sometimes Jet and Amber are found on the Sea Coaſt.

*Market Towns.*

Norwich is the Capital, *w f* and *ſ*
Lynn, *tu* and *ſ*
Yarmouth, *ſ*
Thetford, *ſ*
ttleborough, *th*
leſham, *ſ*
uckingham, *ſ*
urnham, *ſ*
Dereham, *f*
Walſingham, *f*
Downham, *ſ*
Walſham, *w*
Windham, *ſ*
Ropeham, *ſ*
Swaſtham, *f*
Falkenham, *th*
Foulſham, *th*
Hingham, *ſ*
Caſton, *tu*
Comer, *ſ*
Dis, *f*
Harleſton, *w*
Herling, *tu*
Holt, *ſ*
Wotton, *w*
Worſted, *ſ*
Seby, every ſecond *m*

*North-*

### *Northamptonſhire*

Is accounted one of the fineſt Inland Counties in the Kingdom: is 123 Miles in Circuit, and contains about 550,000 Acres, the Air is good, and the Soil rich; hath ſeveral fine Rivers, and abounds in Corn, Wood, and Cattle.

#### *Market Towns.*

Northampton, the County Town, ſ
Peterborough, ſ
Brackley, *w*
Daventry, *w*
Oundle, ſ
Tocheſter, ſ
Rothwell, *m*
Kettering, *f*
Wellingborough, *w*
Trapſtone, *tu*
Cliff, *tu*

### *Northumberland*

Is a Sea County, bordering upon *Scotland*; in ſome parts the Air is ſharp, the Soil thin and barren; but towards the Sea it is tolerably fruitful. In this County are Abundance of Lead and Coal Mines, and from hence come the Coals called Sea-coals. Here are good Store of Wild-fowl, and Fiſh, particularly Salmon.

#### *Market Towns.*

Newcaſtle is the chief Town, ſ
Berwick, ſ
Morpeth, *w*
Hexham, *th*
Wooler, *tu*

### *Nottinghamſhire*

Is an Inland County, in Circuit 110 Miles, and contains 560,000 Acres: The Air is good and healthful, the Soil but indifferent (a great Part being foreſt Ground) the South Part pretty fruitful, the Weſt woody, and yields plenty of Pit-coal. The River *Trent* divides it from *Lincolnſhire*.

#### *Market Towns.*

Nottingham, is the County Town, *w f ſ*
Newark, *w*
Retford, *w*
Mansfield, *th*
Southwell, *f*
Bingham, *th*
Workſop, *w*
Tuxford in the Clay, *m*

### *Oxfordſhire*

Is one of the moſt pleaſant, healthful, and fertile Counties in the Kingdom; it is watered with delightful Rivers, as the *Thames*, the beautiful *Charrald*, &c. but above all, it is famous for having the fineſt Univerſity in the World, which conſiſts of 20 Colleges endowed, and five Halls not endowed, *viz.*

| Founded, *Anno.* | COLLEGES. | By whom founded. |
|---|---|---|
| 872 | *Univerſity,* | by the Saxon King Alfred. |
| 1262 | *Baliol,* | by John Baliol, King of Scotland. |
| 1274 | *Merton,* | by Walter de Merton, Biſhop of Rocheſter. |
| 1316 | *Exeter,* | by Walter Stapleton, Bp. of Exeter. |
| 1325 | *Oriel,* | by King Edward II. |
| 1340 | *Queen's,* | by Robert Eglesford, B. D. |
| 1375 | *New,* | by William of Wickham, Biſhop of Wincheſter. |
| 1427 | *Lincoln,* | by Richard Fleming, and Thomas Rotherham, Biſhop of Lincoln. |
| 1437 | *All Souls,* | by Henry Chichley, Abp. of Cant. |
| 1459 | *Magdalen,* | by William of Wainfleet, Biſhop of Wincheſter. |
| 1511 | *Brazen Noſe,* | by William Smith, Bp. of Lincoln, and Sir Richard Sutton, Knt. |
| 1516 | *Corpus Chriſti,* | by Rich. Fox, Bp. of Wincheſter. |
| 1549 | *Chriſt Church,* | by King Henry VIII. |
| 1555 | *Trinity,* | by Sir Thomas Pope. |
| 1557 | *St. John's,* | by Sir Thomas White, Lord Mayor of London. |
| 1571 | *Jeſus,* | by Queen Elizabeth. |
| 1609 | *Wadham,* | by Nicholas Wadham, Eſq. |
| 1620 | *Pembroke,* | by Thomas Teſdale, Eſq. and Richard Whitwick, B. D. |
| 1700 | *Worceſter,* | by Sir Thomas Cooke. |
| 1740 | *Hartford,* | by Dr Newton. |

| HALLS. | | | |
|---|---|---|---|
| St. Edmund's | belonging to | Queen's | College. |
| St. Alban's | | Merton | |
| St. Mary's | | Oriel | |
| New Inn | | New | |
| Magdalen | | Magdalen | |

*Market Towns in Oxfordſhire.*

Oxford the Capital, *w* and *ſ*
Woodſtock, *tu*
Banbury, *tu*
Burford, *ſ*

Henley, *th*
Watlington, *ſ*
Whitney, *th*
Chipping Norton, *ſ*
Chalbury, *ſ*

Deddington, *ſ*
Biceſter, *f*
Bampton, *w*
Thame, *tu*
Charlbury, *f*

### *Rutland*

Is a ſmall Inland County, 40 Miles in Circumference, containing about 110,000 Acres, affords Plenty of Corn and Cattle; and is remarkable for the Redneſs of the Wool which the Sheep of that County produce, occaſioned b the Colour of the Soil.

*Market Towns.*

Okehampton, *ſ*
Uppingham, *w*

### *Shropſhire*

Is a plentiful Inland County, the Air good, and ſo is th Soil: It is in Circuit 134 Miles, containing about 890,00 Acres, and affords Plenty of Corn, Wood and Pit-coal being accommodated by the River *Severn.*

*Market Towns.*

Shrewſbury the County Town, *w*, *th* and *ſ*
Biſhopſcaſtle, *ſ*
Bridgenorth, *ſ*
Ludlow, *m*
Wenlock, *m*
Eliſmere, *tu*
Whitchurch, *ſ*
Newport, *ſ*
Drayton, *w*
Wem, *th*
Church ſtreton, *t*
Oſweſtry, *w*
Shipton, *tu*

### *Somerſetſhire*

Is a large plentiful Sea County in the Weſt of *Engla* in Circumference 204 Miles, containing about 890,00 Acres: It affords great Plenty of excellent Corn, an good Paſture, which feeds Abundance of fine Cattle; an alſo yields Plenty of Lead, Copper, Cryſtal Stones an Wool for Dyers: Its chief Manufactures are Cloth an Serges.

*Market Towns.*

Briſtol is the Capital, *w* and *ſ*
Bath, *w* and *ſ*
Wells, *w* and *ſ*
Bridgewater, *th*
Ilcheſter, *w*
Taunton, *w* and *ſ*
Wincanton, *w*
Watehet, *ſ*
Southpetherto, *th*
Axbridge, *th*
Sheptonmallet, *ſ*
Somerton, *m*
Willington, *tu*
Bruton, *ſ*
Ilminſter, *ſ*
Dunſtar, *ſ*
Wivilſcomb, *tu*
Caneſham, *th*
Crookhorn, *ſ*
Dulverton, *ſ*
Glaſtenbury, *tu*
Chard, *m*
Longport, *ſ*
Poutford, *tu*
Writon, *tu*

### *Staffordſhire*

Is an Inland County, containing about 810,000 Acre and is 141 Miles in Circuit; the Air is ſharp, but ver

health

healthful; the Soil different: Northward it is hilly and barren, but the Southward is fruitful and pleaſant, and affords Plenty of Corn, Graſs, Iron, and Pit-coal; the middle Part is level, but ſomething woody: This County alſo affords good Stone, Marble, Alabaſter, and Lime-ſtone.

*Market Towns.*

Stafford is the County Town, ſ
Litchfield *tu* and *f*
Newcaſtle, *m*
Burton, *th*
Penbridge *tu*

Utuxetar, *w*
Eccleſhall, *f*
Ridgely, *tu*
Browley, *tu*
Breewood, *tu*
Walſhall, *tu*

Betley, *tu*
Locke, *w*
Tedbury, *th*
Stow, *tu*
Wolverhampton, *w.*

### *Suffolk*

Is a Sea County, 140 Miles in Compaſs, and contains 995,000 Acres; the Soil different; the beſt Part about *St. Edmundſbury*; it affords Abundance of Cattle, and Butter of the beſt, but Cheeſe the worſt in *England.*

*Market Towns.*

Ipſwich is the principal, *w ſ* and *ſ*
Dunwich, *ſ*
Orford, *m*
Aldborough, *ſ*
Sudbury, *ſ*
Eye, *ſ*
Dedingham, *f*

Ixworth, *f*
Needham, *w*
Stowmarket, *th*
Newmarket, *th*
Beecles, *ſ*
Bury, *w*
Hadley, *m*
Framlington, *ſ*
Leſtoff, *w*

Neeyland, *f*
Lavenham, *tu*
Mildenhall, *f*
Bildeſton, *w*
Clare, *f*
Bungay, *th*
Holſworth, *tu*
Mendleſham, *tu*
Woodbridge, [illegible]

### *Surry*

Is an Inland County, parted by the River *Thames* from *Middleſex*: it contains about 592,000 Acres, and is in Compaſs 112 Miles, the Country is plentiful, and the Air healthful; it is famous for Hunting and Horſe-racing: the principal Goods are Hats, made in *Southwark*, for Exportation.

*Market Towns.*

Guilford is the County Town, *ſ*
Ryegate, *tu*

Southwark, *w* and *ſ*
Dorking, *th*

Kingſton, *ſ*
Croyden, *f*
Farnham, *th*

### *Warwickſhire*

Is a pleaſant, healthful, and plentiful County, 155 Miles in Compaſs, and contains about 670,000 Acres:

The Soil for the moſt Part, is good and fertile; on th North a little woody: This County is remarkable fo excellent Cheeſe going by its Name.

*Market Towns.*

Warwick is the
County Town, ſ
Coventry, f
Stratford, th
Atherſtone, tu

Alceſter, tu
Birmingham, th
Coleſhill, w
Henley, m
Kyneton, tu

Nuneaton, ſ
Rugley, ſ
Southam, m
Sutton-colefield,
m

### *Weſtmoreland*

Is a County in the North-weſt of *England*: It is 12 Miles in Circuit, containing about 510,000 Acres: Thi County abounds in Hills and Marſhes, and is not ver plentiful but in ſome of the Vallies and Intervals, an towards the South.

*Market Towns.*

Appleby is the
County Town, ſ
Kendal, ſ

Longſdale, th
Burton, tu
Ambleſide, w

Kirby-ſteven,
Orton, w
Brough, w

### *Wiltſhire*

Is a fine Inland County, 140 Miles in Compaſs, an contains about 876,000 Acres: In the Middle lies *Sali bury Plain,* very remarkable for its large Extent, and fo feeding large Numbers of ſheep; and therefore Wool the principal Commodity.

*Market Towns.*

Saliſbury is the
Capital, w and ſ
Hindon, tu
Chippenham, ſ
Wilton, w
Marlborough, ſ
Malmſbury, ſ

Lavington, w
Wotton-baſſet, th
Crickdale, ſ
Deviſes, th
Dounton, f
Weſtbury, f
Higworth, w

Calne, tu
Warminſter,
Bradford, m
Amſbury, f
Auburn tu
Swindon, m
Trowbridge,

### *Worceſterſhire*

Is a plentiful Inland County, 130 Miles in Circu and contains 540,000 Acres: The Soil is for the moſt Pa good and fertile, affords Corn in great Plenty, and is ver numerous in Cattle: It yields Plenty of Fiſh and Frui The Vale of *Everſham* is juſtly eſteemed one of the mo fertile Spots in the Kingdom.

*Market Towns.*

Worceſter is the Capital, *wſ* and *ſ*
Everſham, *m*
Bewdley, *ſ*
Droitwich, *ſ*
Stowerbridge, *ſ*
Kidderminſter, *th*
Bromſgrove, *tu*
Perſhore, *tu*
Tidbury, *tu*
Upton, *th*
Shipton, *ſ*

## *Yorkſhire*

Is a Maritime County, and much the Largeſt in all *England*, and is divided into three Parts, called *Ridings*, viz. *North*, *Eaſt*, and *Weſt*: 'Tis in general a plentiful County, abounding in Corn, Cattle, Fiſh, and Fowl, and famous for breeding fine Saddle Horſes. It is 320 Miles in Circumference, and contains 3,770,000 Acres, it ſends great Quantities of Woollen Cloth to *London* and elſewhere, being its chief Manufacture.

*Market Towns.*

*York* is the Capital: Market Days *Thurſday* and *Saturday*, with 36 other Market Towns, too numerous here to particularize.

## *THE PRINCIPALITY OF WALES.*

*WALES* was originally independent on *England*, but in the Reign of King *Henry* the VIIth, it was incorporated with it. This Country is very mountainous and barren, xcept in the Vallies and Intervals, where it yields Plenty f Graſs and Corn. The ſituation is Weſtward, bordering on the *Iriſh* Sea; the Air bleak and ſharp, but wholeſome; the Cattle are numerous, but very ſmall; and on he Hills there are Goats in Abundance. This County s divided into North and South; *viz.*

### *North Wales*

Contains Angleſey, Carnarvonſhire, Denbighſhire, Flintſhire, Merionethſhire, and Montgomeryſhire.

*Angleſey* is an Iſland in the North-weſt Part of the Country, about 80 Miles in Compaſs, and contains about 00,000 Acres. It affords Plenty of Corn, Cattle, Fiſh, owl, and Mill-ſtones, (for grinding Corn) in Abundance: t has but two Market Towns, *viz. Beaumaris*, and *New-rough*; *Wedneſday* is the Market Day of the firſt, and *ueſday* of the latter.

*Carnarvonſhire* is a Sea-coaſt County, 110 Miles in Compaſs, containing about 34,000 Acres. It hath Plenty o Corn, Cattle, Fiſh, and Wood; the Air is healthful, and the Soil good, eſpecially the Weſtern Part, which produces Abundance of excellent Barley.

### *Market Towns.*

Carnarvon is the chief, *f*
Bangor, *w*
Krobich, *w*
Polbel, *w*
Aberconway, *f*
Newin, *f*

*Denbighſhire* is 116 Miles in Circuit, and contains abou 410,000 Acres. The Middle of this County hath Plenty of Rye, Coals and Sheep; it hath alſo ſome ſmall Lead-mines: but the chief Part of it is a Valley called *Diffri Cluid*, exceeding pleaſant and fertile, adorned with ſevera Gentlemens Seats, and thoſe of good Eſtates. *Denbigh* i the County Town, and the Market Day on *Wedneſday* *Wrexham* is another of its principal Market Towns, a pretty Town, and famous for its Market, neat Church and lofty Steeple.

*Flintſhire* contains about 160,000 Acres, and is in Circuit 82 Miles. It hath but three Towns, *viz. Flint, St Aſaph*, and *Gairus:* the firſt ſo ſmall that it hath no Market. 'Tis a hilly Country, but the Vales are very fertile, and the Inhabitants commonly live to a great Age Its Commodities are ſmall Cattle, Butter, Cheeſe, Pitcoal, Lead, and Mill-ſtones, in this County is *St Winnifred's Well*, ſo famous for curing Aches, Lameneſs, and as ſome ſay, for Propagation.

*Merionethſhire* is 180 Miles in Circuit, and contain about 500,000 Acres. The County in general is mountainous but yet not without Plenty of ſmall Cattle and other Neceſſaries for the Inhabitants. The chief Manufacture is Cotton-work. The principal Town is *Harlech* which hath a pretty good Market on *Saturdays*.

*Montgomeryſhire* is in Compaſs 94 Miles, and contain 960,000 Acres. 'Tis fruitful, though mountainous, and hath ſix ſmall Market Towns, but no Manufactures worth Notice.

### *South Wales*

Contains Brecknockſhire, Cardiganſhire, Carmathenſhire, Glamorganſhire, Pembrokeſhire, and Radnorſhire

*Brecknockſhire* is 106 Miles in Circuit, and contains about 620,000 Acres, divided into Hills and Valleys; the firſt but barren, but the latter very plentiful, wholeſome, and pleaſant. *Brecknock* is the chief Town, and hath good Trade for Clothing; it hath two good Markets in a Week, *viz. Wedneſdays* and *Saturdays.* The Commodities are Cattle, Fiſh, and ſome ſmall Quantity of Otters Fur.

*Cardiganſhire* is 24 Miles in Compaſs, and contains about 520,000 Acres. It is ſituated on the Bank of the *Iriſh* Sea, and hath Plenty of Corn, Cattle, Fiſh, Fowl, *&c.* Of late Years it is become remarkable for its Silver Copper and Lead Mines.

*Carmarthanſhire* is one of the moſt pleaſant Counties in *Wales*, the Air good and Soil fertile. It affords Plenty of Corn, Cattle, Salmon, Wood, Pit-coal, and the beſt Lead. 'Tis 120 Miles in Compaſs, containing about 700,000 Acres.

*Glamorganſhire* is a very fine plentiful County; in the South Part it is ſo fruitful that it is called, *The Garden of Wales.* It is 112 Miles in Circuit, and contains about 700,000 Acres. *Cardiff* is the County Town, which keeps two Market-days weekly, *viz. Wedneſdays* and *Saturdays.*

*Pembrokeſhire* is a very pleaſant and plentiful County, for the moſt Part ſurrounded by the Sea. It is 93 Miles in Compaſs, and contains about 520,000 Acres. This County is famous for a Harbour called *Milford Haven*, which is juſtly eſteemed to be in all reſpects one of the beſt in the World. *Pembroke* is the principal Town, whoſe Market is kept on *Saturday.*

*Radnorſhire* is one of the moſt barren and unfruitful Counties in all *Wales.* It is in Circuit 90 Miles, and contains about 310,000 Acres. The aſſizes are uſually kept at *Preſtain*; but *Radnor* is the Shire Town, and hath a tolerable Market upon *Saturday*, and *Preſtain* hath another on *Wedneſday.*

## *Scotland*

Is ſituated to the North of *England*; the Capital City is called *Edinburgh*; it is divided into the following Shires or Counties.

| | | Chief Towns. |
|---|---|---|
| To the South of the Firth of Forth. | Galloway, | Kircudbright, |
| | Nithſdale, | Dumfries, |
| | Annandale, | Annan, |
| | Eſkdale, with Euſdale, | |
| | Lidſdale, | Hermitage, |
| | Tiviotdale, | Jedburgh, |
| | The Mers, | Dunſe, |
| | Lauderdale, | Lauder, |
| | Tweedale, | Peebles, |
| | Clyddeſdale, | Glaſgow, |
| | Keyle, | Air, |
| | Carrick, | Bargenny, |
| | Lothian, | Edinburgh, |
| | Stirling, | Stirling, |
| | Renfrew, | Renfrew, |
| | Cunningham, | Irwin, |
| | Iſles of Bute, | Rotheſay, |
| | Arran, | |
| | Peninſula of Cantire, | Kilkerran, |

| | | Chief Towns. |
|---|---|---|
| To the North of the Firth of Forth. | Fife, | St. Andrews, |
| | Monteith, | Dumblain, |
| | Lenox, | Dumbarton, |
| | Argyle, | Inverary, |
| | Perth, | Perth, |
| | Strahern, | Abernethy, |
| | Broadalbin, | |
| | Lorn, | Dunſtaffnuge, |
| | Merns, | Bervy, |
| | Angus, | Dundee, |
| | Goury, | |
| | Athol, | Blair, |
| | Mar, | Aberdeen, |
| | Radenoch, | Ruthven, |
| | Lochabar, | Innellochy, |
| | Buchan, | Peterhead, |
| | Bam, | Banff, |
| | Murray, | Elgin, |
| | Roſs, | Tayne, |
| | Sutherland, | Dornoch, |
| | Strathnavan, | Strathy, |
| | Caithneſs, | Wick, |

To theſe may be added the Hebrides, or Weſtern Iſles, ſaid to be above 300 in Number, the moſt conſiderable of which are Arran, Sky, and Mull; and the Iſles of Orkney, and Shetland, to the Northward of each of which, there are many in Number.

## *Ireland*

Is a large Iſland, to the Weſt of *England* and *Scotland*, the chief City of which is *Dublin*; it is divided into four Provinces, which are again ſubdivided into the following Counties.

| | | | |
|---|---|---|---|
| Leinſter. | Louth, | Chief Towns. | Drogheda, |
| | Dublin, | | Dublin, |
| | Wicklow, | | Wicklow, |
| | Wexford, | | Wexford, |
| | Longford, | | Longford, |
| | Meath, | | Mullingar, |
| | King's County, | | Philipſtown, |
| | Queen's County, | | Maryborough, |
| | Kilkenny, | | Kilkenny, |
| | Kildare, | | Kildare, |
| | Catherlough, | | Carlow, |
| Ulſter. | Down, | Chief Towns. | Down, |
| | Armagh, | | Armagh, |
| | Monaghan, | | Monaghan, |
| | Cavan, | | Cavan, |
| | Antrim, | | Carrickfergus, |
| | Londonderry, | | Londonderry, |
| | Tyrone, | | Dungannon, |
| | Fermanagh, | | Inniſkillen, |
| | Donegal, | | Donegal, |
| Connaught. | Leitrim, | C. Towns. | Leitrim, |
| | Roſcommon, | | Athlone, |
| | Galway, | | Galway, |
| | Mayo, | | Mayo, |
| | Sligo, | | Sligo, |

| Munſter. | Chief Towns. |
|---|---|
| Tipperary, | Clonmell, |
| Waterford, | Waterford, |
| Clare, | Clare, |
| Limerick, | Limerick, |
| Cork, | Cork, |
| Kerry, | Dingle. |

In St. George's Channel, almoſt equally diſtant fro England, Scotland, and Ireland, is ſituated the Iſle Man, the Royalty of which, under the Kings of Gre Britain, was formerly in the Family of the Stanleys, Ear of Derby; but the Male Iſſue of that Family being extin it was enjoyed by the Duke of Athol, deſcended from th Derby Family by a Female Branch, till the Seſſion of Parliament 1765, when it was annexed to the Crown.

The Britannic Iſles above deſcribed are ſeparated fro France, on the South by the Engliſh Channel; and fro the Netherlands, Germany, Denmark and Norway, by th German Ocean on the Eaſt; the Northern and Weſter Sides being waſhed by the Ocean ſo called.

The Netherlands have Germany on the Eaſt and North the German Ocean to the Weſt, and France to the South they conſiſt of ſeventeen Provinces; of which ſeven compoſe a Republic, called the United Provinces; and th remaining ten are ſubject to the Houſe of Auſtria.

The ſeven United Provinces are inhabited by the Dutc and are commonly called Holland, after the Name of th moſt conſiderable of them; the Names of the Provinces an their Capitals follow:

| Provinces. | Chief Towns. |
|---|---|
| Holland, | Amſterdam, |
| Zealand, | Middleburgh, |
| Utrecht, | Utrecht, |
| Guelderland, | Zatphen, |
| Over Iſſel, | Deventer, |
| Frieſland, | Leewarden, |
| Groningen, | Groningen. |

The ten Provinces are now commonly called the Auſtrian Netherlands or Flanders, from the Name of one them: the Names of their Provinces, and their Capita follow:

Pro

| Provinces. | Chief Towns |
|---|---|
| Guelderland, | Guelders, |
| Brabant, | Bruſſels, |
| Luxemburgh, | Luxemburgh, |
| Limburgh, | Limburgh, |
| Flanders, | Bruges, |
| Artois, | Arras, |
| Hainault, | Mons, |
| Namur, | Namur, |
| The Marquiſite of the Empire, | Antwerp, |
| Malines, | Malines, |

The Empire of Germany has on the Eaſt Side Pruſſia, Poland, and Hungary; the Baltic Sea, Denmark and the German Ocean on the North; the Netherlands, and Part of France on the Weſt; and the Alps which ſeparate it from Italy on the South.

This Country is a large Republic, whoſe Chief Officer is called the Emperor; he is elected by nine of the moſt conſiderable Princes, thence called Electors, their Names and principal Cities follow:

| Electors. | Chief Towns. |
|---|---|
| The Archbiſhop of Mentz, | Mentz, |
| The Archbiſhop of Triers, | Triers, |
| The Archbiſhop of Cologne, | Cologne, |
| The Queen of Bohemia, | Prague, |
| The King of Pruſſia as Marquis of Brandenburgh, | Berlin, |
| The Duke of Saxony, | Dreſden, |
| The King of Great Britain as Duke of Brunſwick Lunenburgh. | Hanover, |
| The Duke of Bavaria, | Munich, |
| The Count Palatine of the Rhine, | Manheim, |

There are great Numbers of other Dominions in Germany, but for Brevity's Sake, we ſhall here mention only.

| | Ch. Towns. |
|---|---|
| The Archduchy of Auſtria, | Vienna, |
| The Langraviate of Heſſe-Caſſel, | Caſſel, |
| The Dutchy of Wirtenburgh, | Stutgard, |
| Alſace, now ſubject to the French, | Straſburg. |

There are alſo in *Germany* ſeveral free Cities, which are ſo many ſmall Commonwealths under the Protection of the *Germanic* Body, ſuch as *Ratiſbon, Francfort, Hamburgh,* &c. And among the *Alps* are other ſmall Commonwealths, commonly known by the Name of the *Swiſs Cantons,* the principal of which are *Zurich, Berne, Baſil,* and *Friburgh*; with theſe are confederated the Republic of *Geneva,* and the Leagues of the *Griſons,* all ſituate among thoſe Mountains.

The Kingdom of *Hungary* hath *Poland* on the North, *Germany* on the Weſt, and on the other Sides the *Turkiſh* Empire; the chief City is called *Buda*; other conſiderable Cities are *Preſburg, Raab, Zygeth, Caniſia, Alba Regalis, Gran, Strygonium, Peſt, Temeſwaer,* &c. all famous in Hiſtory on account of the Contentions between the Chriſtians and *Turks,* for the Sovereignty of this Kingdom.

It is at preſent under the Dominion of *Joſeph,* Emperor of *Germany,* Son of the late *Maria Tereſa,* (Daughter to the Emperor *Charles* the Sixth,) who was Queen of *Hungary* and *Bohemia,* Archducheſs of *Auſtria,* &c. and was married to *Francis,* the late Emperor of *Germany,* Great Duke of *Tuſcany,* &c.

*Poland* is a large elective Kingdom, bounded on the Eaſt by *Crim Tartary* and *Muſcovy*; on the North by Part of *Muſcovy* and the *Baltic* Sea; on the Weſt by *Germany,* and on the South by *Hungary* and Part of *Turkey*; the Capital City is called *Warſaw.*

*Denmark* and *Norway,* two Kingdoms under the ſame Sovereign, are bounded on the North and Weſt by the Ocean, on the South by Part of *Germany,* and the *Baltic* Sea, and on the Eaſt by *Sweden*; the Capital of *Denmark* is called *Copenhagen,* and that of *Norway, Bergen.*

*Sweden* has *Denmark* on the Weſt, the *Baltic* Sea on the South, *Muſcovy* on the Eaſt, and the Ocean on the North; the chief City is called *Stockholm.*

*Muſcovy* or *Ruſſia,* has Part of *Sweden* and the *Baltic* Sea on the Weſt, *Poland* and *Crim Tartary* on the South; *Great Tartary* in *Aſia* on the Eaſt, and the Ocean on the North; the ancient Capital is called *Moſcow*; but the Reſidence of the Court is now generally at *Peterſburg* on the *Baltic* Sea. This Empire is very extenſive, being near as big as all the reſt of *Europe.*

*Aſia* is ſeparated from *Europe* toward the North-weſt by the Boundaries above deſcribed, toward the South-Weſt by the Eaſtern Part of the *Mediterranean* Sea; and by the Iſthmus of *Suez* and the *Red Sea,* which divide it from *Africa*; it is bounded on the South by the *Indian* Ocean; on the Eaſt by the *Pacific,* and on the North by the Northern or Frozen Ocean; its Dimenſions may be conceived from what follows. *Holy Cape,* on the Northern Ocean, in Lat. 72. 32 N. Long. 179; 45 E. Diſtance 5540 Miles. Point of *Java,* one of the *Indian* Iſlands, in Lat. 8. 30 S, Long. 115. 55 E. N. 28: 45 E. Diſtance 5540 Miles. And Cape *Ava,* in the Iſland of *Japan,* in the *Pacific Ocean,* Lat. 34: 45 N. Long. 141: 00 E. bears from *Smyrna,* in the *Archipelago,* Lat. 38; 28 N. Long. 27: 25 E. S. 87. E. Diſtance 5550 Miles.

It ſeems moſt regular to divide this large Country according to its preſent Poſſeſſors, the Grand Signior or Emperor of the *Turks,* the Sophy or King of *Perſia,* the Great Mogul, and the other Potentates of *India,* the Emperor of *China,* and the Potentates of *Tartary.*

The *Turks* Poſſeſſions in *Aſia* are *Antolio, Syria, Arabia, Armenia,* or *Turcomania, Georgia,* and *Meſopotamia* or *Diarbeck*; of which in their order.

*Anatolia,* formerly called *Aſia-Minor,* is encompaſſed on the North, Weſt, and South Sides, by the *Euxine,* the *Marmarian,* the *Archipelago,* and the *Mediterranean* Seas; it is ſeparated from *Syria* on the South Eaſt by the Mountains called *Taurus,* and from *Murcomania* on the Eaſt by the River *Euphrates.*

Its preſent Subdiviſions are ſaid to be four, *Anatolia Proper,* on the North-Weſt, its Capital City, *Burſa*; *Amatia,* on the North-Eaſt, having a Capital of the ſame Name; *Caramania* on the South-Weſt, its Capital, *Cogni*; and *Alatuli* on the South-Eaſt; its Capital *Maraz.*

*Syria,* called by the *Turks, Suriſtan,* is generally ſubdivided into *Syria Proper, Phœnicia,* and *Paleſtine* or *Judea*; whoſe chief Cities are *Aleppo, Damaſcus* and *Jeruſalem.*

*Arabia* (a Country which preſerves its ancient Name, as do the Inhabitants their roaming Diſpoſition) is bounded on the Weſt by the *Red Sea* and Iſthmus of *Suez*; on the North by *Paleſtine, Syria,* and *Diarbeck*; on the Eaſt by the *Perſian* Gulf, and on the South-Weſt by the *Arabian* Sea, a Part of the *Indian* Ocean.

It is divided into three Parts, called the *Deſart*, the *Stony*, and the *Happy*; the two firſt lie to the Northward, the other to the South.

There are very few Towns in the Deſart or Stony Parts of this Country, the *Arabs* living in Tents, and removing with their Families from Place to Place as Profit or Convenience ſuggeſt. But in *Arabia the Happy* (one of the fineſt Countries in the World) there are ſeveral of Note, ſuch as *Medina*, where the Sepulchre of *Mahomet*, the Founder of the *Turkiſh* Religion, is; *Mecca*, his Birth-place, to which every *Turk* or Muſſelman is obliged by that Religion to come in Pilgrimage once in his Lifetime, or to ſend another in his Stead; *Aden*, a Place of Traffic; *Sana*, *Mocha*, *Soar*, and others.

*Armenia* or *Turcomania* is bounded on the Weſt by *Anatolia*, on the South by *Diarbeck*, on the Eaſt and North by *Georgia* and the *Euxine* Sea; its principal Cities are *Arzerum*, *Chars* and *Van*.

*Georgia*, formerly called *Iberia*, including *Mingrelia* and *Gurgeſtan*, is bounded on the North by Part of *Muſcovy*, on the Weſt by the *Euxine* Sea, on the South by *Turcomania*, and Part of *Perſia*, and on the Eaſt by Part of *Perſia*; the Cities of the greateſt Note are *Faſſo* and *Teſflis*.

*Meſopotamia* or *Dierbeck*, is bounded on the North by *Turcomania*, on the Weſt by *Syria*, on the South by *Arabia the Deſart*, and on the Eaſt by *Perſia*; its principal Cities are *Diarbekir*, *Moſul* and *Bagdat*.

Beſides theſe large Poſſeſſions on the Continent of *Aſia*, the Turks hold ſeveral Iſlands in the *Archipelago*; with *Rhodes* and *Cyprus* in the *Mediterranean* Sea, the laſt of which is very conſiderable.

The next Diviſion of *Aſia*, proceeding Eaſtwardly, is *Perſia*, which has the *Turkiſh* Dominions on the Weſt, the *Perſian* Gulph and Part of the *Indian* Ocean on the South, the Empire of the Great Mogul on the Eaſt, and, on the North, Part of *Tartary*, the *Caſpian* Sea, and Part of the *Muſcovian* Empire.

This is a very large Country, but at preſent torn to pieces by different Competitors for the Sovereign Power; the Capital City is *Iſpahan*; the moſt conſiderable of the others are *Derbent* on the *Caſpian* Sea, and *Gombroon* and *Baſſora* on the *Perſian* Gulph.

Proceeding ſtill Eaſtward, the next Empire is that of the Great Mogul, which has *Perſia* on the Weſt, the two *Indian* Peninſulas and the Bay of *Bengal* on the South, *China* on the Eaſt, and Part of *Tartary* on the North.

This is another large Tract, with the inland Parts of which the *Europeans* are not much acquainted.

The principal Cities are *Agra*, *Labor*, *Delli*, *Cabul*, and *Caximir*; but whether *Agra* or *Labor* is the Capital, is difficult to determine, as Authors do not agree concerning it; it is agreed, however, that the Mogul hath a magnificent Palace at each of theſe Cities.

The maritime Parts of the Continent of *India* are divided by the Bay of *Bengal*, a Branch of the *Indian* Ocean into two Peninſulas, antiently called *India*, within or on this Side the *Ganges* and *India*, without or beyond the *Ganges*; beſides which two Peninſulas, there are ſeveral large Iſlands belonging to *India*, of which in their Order.

The Peninſula on this Side the *Ganges*, contains ſeveral diſtinct Territories or Kingdoms, moſt of which either are or were ſubject, or at leaſt tributary, to the Mogul; the Weſtern Side thereof is called the Coaſt of *Malabar*, the Eaſtern the Coaſt of *Coromandel*.

The Coaſt of *Malabar* contains ſeveral *European* Settlements; ſuch as *Bombay*, an Iſland belonging to the *Engliſh Eaſt-India* Company, and *Goa*, to the *Portugueſe*, at each of which they have the Sovereignty; and the *Engliſh* Trade at leaſt, if they have not Forts, at *Cuzurat*, *Surat*, *Calicut*, and *Cochin*.

The Iſland called *Ceilan* or *Ceylon*, by ſome called *Zeloan*, is ſituated a little to the Eaſt of Cape *Comerin*, the moſt Southern Point of this Peninſula.

The Coaſt of *Coromandel*, which is waſhed by the Bay of *Bengal*, tends towards the North and North Eaſt from Cape *Comerin*, and extends to the Mouth of the *Ganges*; the principal Settlements of the *Engliſh* on this Coaſt are, *Madras* or *Fort St. George*, and *Fort St. David*, near which the *French* had a Settlement called *Pondicherry*; which neighbouring Settlements were for ſeveral Years at War with each other, with various Succeſs, the Natives, headed by their Princes, called Nabobs, having taken part therein, ſome on one Side, and ſome on the other; but the *Engliſh* were at laſt victorious, and have lately had large Provinces yielded to them by the Princes of the Country.

The Peninſula on the other Side of the *Ganges*, conſiſts of the large Kingdoms of *Bengal*, having a Capital of the ſame Name; *Pegu*, whoſe chief Cities are *Pegu* and *Arracan*; *Siam*, having a Capital of the ſame Name; *Malacca* ſituate to the South, is almoſt encompaſſed by the Sea, and the City, ſo called, is ſituate near the Southern Extremity; *Cochin-china*, whoſe chief City is *Cambodia*, and *Tunquin*, whoſe Capital is of the ſame Name.

South-Weſt of *Malacca* is the Iſland of *Sumatra*.

South-Eaſt of this lies the Iſland of *Java*, ſeparated by the Straits of *Sunda*; the Weſtern Point of which is called *Java Head* by *Engliſh* Mariners, it being often the firſt Land made by them after they have doubled the Cape of *Good Hope*; the principal Cities are *Bantam* and *Batavia* the latter of which belongs to the *Dutch Eaſt-India* Company, who are Sovereigns (or, if not, yet act as ſuch) over the greateſt Part of this large and fruitful Iſland.

Eaſtward from *Malacca* and *Sumatra* is the Iſland *Borneo*, almoſt round, and near 600 Miles in Diameter.

The Iſland *Celebes* is to the Eaſt of *Borneo*, and much leſs than it. Proceeding Eaſtward are the *Molucca* or *Spice Iſlands*; the *Dutch* have made themſelves Maſters of theſe, and thereby engroſs the Spice Trade to themſelves.

The *Philippine* Iſles are very numerous, ſome Authors have reckoned 10,000 of them; the moſt conſiderable is *Luconia*, whoſe Capital is *Manilla*.

To the North and North-Weſt of theſe is ſituated the potent Empire of *China*, reckoned by ſome to be as big as all *Europe*; it hath the *Pacific Ocean* on the Eaſt and South-Eaſt: *Cochin-China* and *Tunquin* on the South-Weſt; the Mogul's Empire on the Weſt, and on the North-Weſt and North a Part of *Tartary*.

There are a great Number of Cities in this Empire, of which *Pekin*, ſituated in the Northern Part of the Country is the Capital; the *European* Trade to this Country is chiefly carried on at *Canton*, a great Sea-port in one of the Southern Provinces.

The moſt conſiderable *Chineſe* Iſlands are thoſe which compoſe the Empire of *Japan*, which conſiſts of ſeveral large Iſlands, three of which are very conſiderable, *viz.* *Japan* or *Niphon*, whoſe Capital is *Meaco*; *Tonſu*, whoſe Capital is *Sanuqui*; and *Bongo*, whoſe Capital bears the ſame Name.

Thus we have taken a curſory Survey of all the Southern Parts of *Aſia*; the Northern hath only one general Name *viz.* *Tartary*, which has *Perſia*, *India*, and *China*, on the South, the *Pacific* Ocean on the Eaſt, the Northern or Frozen Ocean on the North, and *Muſcovy* on the Weſt; this large Tract is ſubject to divers Potentates, ſome of whom are very little known.

*Africa* is a large Peninſula which is joined to the Continent of *Aſia*, by the Iſthmus of *Suez*, a narrow Deſart between the *Mediterranean* and *Red* Seas; its Magnitude may be conceived by knowing that the *Cape of Good Hope* in Lat. 34° 15′ S. Long 20° 07′ E. bears from *Ceuta* in Lat. 35° 45′ N. Long. 4° 42′ W. S. 18° 15′ E. Diſtance 4440 Miles; and that *Cape Guardafuy*, in Lat. 11° 48′ N. Long. 50° 25′ E. bears from *Cape Sierra Leone*, in Lat. 8° 30′ N. Long. 12° 7′ W. N. 87° 00′ E. Diſtance 3700 Miles.

Very little of the inland Parts of this Continent are known to the *Europeans*; ſo that only the Sea-coaſts will be mentioned here, beginning at the Iſthmus of *Suez*, and coaſting firſt the *Mediterranean* Sea.

*Egypt* is under the Dominion of the *Turks*; its preſent Capital is called *Caïro*; the piratical States of *Tripoly*, *Tunis*, and *Algiers*, have Capitals of the ſame Name, and the Capital of the Empire of *Morocco* is the city of *Fez*.

Along the Coaſts of the *Atlantic* Ocean, there are no extenſive Dominions, the Inhabitants being moſtly ſubject to petty Princes of their own, who being almoſt continually at War with one another, ſell their Priſoners for Slaves: The *European* Nations have been induced, for the Protection of their Trade therein, and other Commodities, to erect ſeveral ſmall Forts in different Places, to enumerate which would be tedious: The *Madeiras*, the *Canaries*, and the *Cape de Verd Iſlands*, are the moſt conſiderable on this Coaſt; the only one poſſeſſed by the *Engliſh* is a very ſmall one, called *St. Helena*, frequented by the *Eaſt-India* Ships.

At the ſouthern Extremity of the Continent is ſituated the *Cape of Good Hope*, where there is a tolerable Town for the Convenience of Shipping, built by the *Dutch Eaſt-India* Company, but taken from them, during the preſent war, by the Engliſh; from hence, along the Eaſtern Coaſt, both on the Ocean and in the *Red Sea*, very little remarkable offers itſelf to notice.

At ſome Diſtance, however, from that Part of this Coaſt which is waſhed by the Ocean, is ſituated one of the largeſt Iſlands in the World, called *Madagaſcar*, which has been at different Times the Aſylum of *European* Pirates.

*America*, by ſome called the New World, becauſe diſcovered about 280 Years ago, being, before that Time unknown to the Inhabitants of *Europe*, *Aſia*, and *Africa*, is divided into two remarkable Diviſions, called North and South *America*, which are joined together by the Iſthmus of *Darien* or *Panama*.

The Sea-coaſt of North *America*, and Part of the inland Countries, are at preſent ſubject to the *European* Nations; the *French* poſſeſs *Canada* or *New-France*, whoſe capital City is *Quebec**, ſituate on the great River *St. Laurence*, which running behind the *Engliſh* Settlements, has given them the Opportunity of extending themſelves far up into the Country, and becoming very troubleſome Neighbours to the *Engliſh*: *Newfoundland*, a large Iſland near the Mouth of this River, belongs to the *Engliſh*, and *Cape Breton**, a much ſmaller, but well fortified, to the *French*.

The *Americans* poſſeſs a large Tract of the Sea-coaſt of the *Atlantic* Ocean, for *Charles-Town*, in *South-Carolina*, Lat. 33° 22′ N. Long. 79° 50′ W. bears from *Cape Canſo* in *Nova-Scotia*, Lat. 45° 10′ N. Long. 49° 50′ W. S. 52° *Engliſh* Miles to a Degree, make 1345 *Engliſh* Miles, which making Allowance for the Windings and the Coaſt may be very well ſuppoſed to be really more than 1500 *Engliſh* Miles. The Names of their Plantations or Settlements, with their chief Towns, follow :

| | Chief Towns. |
|---|---|
| Nova-Scotia, | Halifax, |
| New-England, | Boſton, |
| New-York, | New-York, |
| Penſylvania, | Philadelphia, |
| New-Jerſey, Eaſt, | Elizabeth-Town, |
| New-Jerſey, Weſt, | Elſingburg, |
| Maryland, | Baltimore, |
| Virginia, | James-Town, |
| North-Carolina, | Edenton, |
| South Carolina, | Charles-Town, |
| Georgia, | Savannah. |

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* Quebec, Cape Breton, *and all other fortreſſes in thoſe Parts, were taken from the* French *during the glorious War, of* 1765.

The *Engliſh* poſſeſs the Sea-coaſt of *Florida*, the next Southern Country, the principal Settlement therein being *St. Auguſtine*; the *French* had ſome Settlements to the Weſt of theſe along the River *Miſſiſſippi*, which empties itſelf into the Gulph of *Mexico*, the principal is *Fort Louis*, from whence the Country is called *Louiſiana*; but have lately exchanged them with *Spain* for the Iſland of *Hiſpaniola*, which they were before in Poſſeſſion of but a Part.

More to the South-Weſt is the Empire of *Mexico* and its Dependants, having a Capital of the ſame Name, ſubject to the *Spaniards*; this Country extends itſelf Weſtward to the *Pacific* Ocean, and the *Spaniards* ſend Ships yearly from *Acapulco*, a Port therein, acroſs the Ocean, to the *Philippine* Iſle in the *Eaſt-Indies*.

Northward, on the *Pacific* Ocean, is *New Mexico*, and the Iſland of *California*; but of theſe we know but little.

The Continent of *South-America* conſiſts of the following large Diſtricts.

| | Chief Towns. | In the Poſſeſſion of |
|---|---|---|
| Terra Firma, | Panama, | Spaniards, |
| Golden Caſtile, | Carthagena, | Spaniards, |
| Guiana, | Surinam, | Dutch, |
| Peru, | Lima, | Spaniards, |
| Chili, | St. Jago, | Spaniards, |
| Patagonia, | | Natives, |
| Terra del Fuego, | | Natives, |
| La Plata, | | Spaniards, |
| Brazil, | Buenos Aires, | Portugueſe |
| Paraguay, | St. Salvador, | Jeſuits, |
| Amazonia, | Aſſumption, | Natives. |

N. B. *Terra del Fuego* is an Iſland ſeparated from *Patagonia* by the Straits of *Magellan*.

The Gulph of *Mexico*, *Jachatan*, *Honduras*, and the *Caribbean Sea* are ſeparated from the *Atlantic* Ocean by a great Number of Iſlands called the Bahama, the greater and leſſer *Antilles*, and the *Caribbee Iſlands*. The Names of the moſt conſiderable are as follow.

Cuba,

| | Chief Towns, | In the Poſſeſſion of the |
|---|---|---|
| Cuba, | Havannah. | Spaniards, |
| Hiſpaniola, or St. Domingo, | St. Domingo, | French, |
| Jamaica, | Port-Royal, | Engliſh, |
| Porto Rico, | Porto-Rico, | Spaniards, |
| Anguilla, | | Engliſh, |
| Barbuda, | | Engliſh, |
| St. Chriſtopher's, | | Engliſh, |
| Nevis, | | Engliſh, |
| Antigua, | | Engliſh, |
| Montſerrat, | | Engliſh, |
| Barbadoes, | Bridge-Town | Engliſh, |
| Guadaloupe, | | French, |
| Martinico, | | French, |
| St. Martin, | | Engliſh, |
| Santa Cruz, | | French, |
| St. Lucia, | | French. |

The Iſlands called *Bermudas*, lying about 500 Leagues Eaſt of *Florida*, are ſubject to the *Engliſh*.

## *ASTRONOMY.*

ASTRONOMY is a Science which treats of the Motions and Diſtances of the heavenly Bodies, and of the Appearances thence ariſing.

There have been a great Variety of Opinions, among the Philoſophers of the preceding Ages, concerning the Diſpoſition of the great Bodies of the Univerſe, or of the Poſition of the Bodies which appear in the Heavens: But the Notion now embraced by the moſt judicious Aſtronomers is, that the Univerſe is compoſed of an infinite Number of Syſtems or Worlds; that in every Syſtem there are certain Bodies moving in free Space, and revolving at different Diſtances around a Sun, placed in or near the Centre of the Syſtem; and that theſe Suns, or the other Bodies, are the Stars which are ſeen in the Heavens.

That Syſtem, in which our Earth is placed, is by Aſtronomers called the *Solar Syſtem*; and that Opinion, which ſuppoſes the Sun to be fixed, in or near the Centre, with ſeveral Bodies revolving round him, at different Diſtances, is confirmed by all the Obſervations hitherto made.

This Opinion is called the *Copernican Syſtem*; from *Nicholas Copernicus*, a *Poliſh* Philoſopher, who, about the Year 1473, revived this Notion from the Oblivion it had been buried in for many Ages.

The Sun therefore placed in the Midſt of an immenſe Space, wherein ſix opaque ſpherical Bodies revolve about him as their Centre.

Theſe wandering Globes are called the Planets, who at different Diſtances, and in different Periods perform their Revolutions, from Weſt to Eaſt, in the following Order.

I. ☿ *Mercury* * is neareſt to the Sun of all the Planets, and performs its Courſe in about three Months, or 87$^{d}$. 23$^{h}$. II. ♀ *Venus*, in about ſeven Months and a half, or 224$^{d}$. 17$^{h}$. III. ⊕ the *Earth*, in a Year, 365$^{d}$. 6$^{h}$. IV. ♂ *Mars*, in about two Years, or 686$^{d}$. 23$^{h}$. V. ♃ *Jupiter*, in twelve Years, or 4232$^{d}$. 12$^{h}$. VI. and laſtly, ♄ *Saturn* whoſe † Orbit includes all the reſt, ſpends almoſt thirty Years, that is 10759$^{d}$. 8$^{h}$. in one Revolution round the Sun. The Diſtances of the Planets from the Sun are nearly in the following Proportion, *viz.* ſuppoſing the Diſtance of the Earth from the Sun to be divided into 1000 equal Parts; that of *Mercury* will be about 387 of thoſe Parts; of *Venus* 724; of *Mars* 1524; of *Jupiter* 5201; and that of *Saturn* 9538.

The Orbits of the Planets are not all in the ſame Plane, but variouſly inclined to one another: ſo that, ſuppoſing the Orbit of the Earth to be the Standard, the others will have one Half above, and the other Half below it; interſecting one another in a Line paſſing through the Sun.

The Plane of the Earth's Orbit is called the Ecliptic; and this the Aſtronomers make the Standard, to which the Planes of the other Orbits are judged to incline.

The right Line paſſing through the Sun, and the Common Interſection of the Plane of the Orbit of any Planet with the Ecliptic, is called the Line of the

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* *The Characters, placed before the Names of the Planets, are for Brevity's Sake commonly made uſe of by Aſtronomers, inſtead of the Words at length,* ♀ *as for* Venus, *&c.*

† *By the Orbit of a Planet, is commonly underſtood the Track or Ring, deſcribed by its Circuit round the Sun; but, by the Plane of the Orbit, is meant a flat Surface, extended every Way through the Orbit infinitely.*

Nodes of that Planet, and the Points themſelves, wherein the Orbits cut the Ecliptic, are called the Nodes.

The Inclinations of the Orbits of the Planets to the Plane of the Ecliptic, are as follows, *viz.* the Orbit of *Mercury* makes an Angle of 6° 52′; that of *Venus* 3° 23′; of *Mars* 1° 52′: of *Jupiter* 1° 20′; and of *Saturn* 2° 20′. The Orbits of the Planets are not Circles, but Ellipſes or Ovals.

What an Ellipſis is, may be eaſily underſtood from the following Deſcription; imagine two ſmall Pegs fixed upright on any Plane, and ſuppoſe them tied with the Ends of a Thread, ſomewhat longer than their Diſtance from one another; now if a Pin be placed in the Double of the Thread, and turned quite round (always ſtretching the Thread with the ſame Force) the Curve deſcribed by the Motion will be an Ellipſis. The two Points where the Pegs ſtood, (about which the Thread was turned) are called the Focuſes or Foci of that Ellipſis; and, if, without changing the Length of the Thread, we alter the Poſition of the Pegs, we ſhall then have an Ellipſis of a different Kind from the former; and the nearer the *Focuſes* are together, the nearer will the Curve deſcribed be to the Circle, until at laſt the two Focuſes coincide, and then the Pin in the Doubling of the Thread will deſcribe a perfect Circle.

The Orbits of all the Planets have the Sun in one of their Focuſes, and half the Diſtance between the two Focuſes is called the Excentricity of the Orbits. This Excentricity is different in all the Planets, but in moſt of them it is ſo ſmall, that in little Schemes or Inſtruments, made to repreſent the planetary Orbits, it need not be conſidered.

If, as before, we ſuppoſe the mean Diſtance of the Earth from the Sun to be divided into 1000 Parts; then will the Excentricity of *Mercury* be 81 of thoſe Parts; that of *Venus* 5; and that of the *Earth*, 17; that of *Mars*, 141; that of *Jupiter*, 240; and that of *Saturn*, 543 of the ſame Parts.

The Six Planets above-mentioned, are called Primaries, or primary Planets; but, beſides theſe, there are ten other leſſer Planets; which are called Secondaries, Moons, or Satellites. Theſe Moons always accompany their reſpective Primaries, and perform their Revolutions round them, whilſt both together are alſo carried round the Sun.

Of the ſix Primary Planets, there are but three, as far as Obſervation can aſſure us, that have theſe Attendants, *viz.* the *Earth*, *Jupiter*, and *Saturn*.

The *Earth* is attended by the Moon, who performs her Revolution in about 29½ Days, at the Diſtance of about 30 Diameter of the *Earth* from it; and once a Year is carried round the Sun along with the *Earth*.

*Jupiter* has four Moons or Satellites; the firſt or innermoſt performs its Revolution in about one Day and 18½ Hours, at the Diſtance of 5½ Semidiameters of *Jupiter* from his Centre; the ſecond revolves about *Jupiter* in 3 Days and 13 Hours, at the Diſtance of 9 of his Semidiameters; the Third in 7 Days and 4 Hours, at the Diſtance of 14⅓ Semi Diameters; the Fourth and outermoſt performs its Courſe in the Space of 16 Days 18 Hours, and its Diſtance from *Jupiter*'s Centre is 25 ⅓ of his Semidiameters.

*Saturn* has no leſs than five Satellites; the firſt or innermoſt revolves about him in 1 Day and 21 Hours, at the Diſtance of 4⅜ Diameters of *Saturn* from his Centre; the Second completes his Period in 2¾ Days, at the Diſtance of 5⅗ Diameters; the Third, in about 4½ Days, at the Diſtance of 8 Diameters; the Fourth performs his Courſe in about 16 Days, at the Diſtance of 8 Diameters; the Fifth and outermoſt takes 79⅓ Days to finiſh his Courſe, and is 54 Diameters of *Saturn* diſtant from his Centre. The Satellites, as well as the Primaries, perform their Revolutions from Weſt to Eaſt; the Planes of the Orbits of the Satellites of the ſame Planet are variouſly inclined to one another, and conſequently are inclined to the Plane of the Orbit of their Primary.

Beſides theſe attendants, *Saturn* is encompaſſed with a thin Ring that does no where touch his Body; the Diameter of this Ring is to the Diameter of *Saturn*, as 9 to 4; and the void Space, between the Ring and the Body of *Saturn* is equal to the Breadth of the Ring itſelf; ſo that in ſome Situations, the Heavens may be ſeen between the Ring and his Body.

This ſurpriſing Phenomenon of *Saturn's* Ring is a Modern Diſcovery; neither were the Satellites of *Jupiter* and *Saturn* known to the Ancients; the Jovial Planets were firſt diſcovered by the famous *Italian* Philoſopher *Galilæus*, by a Teleſcope, which he firſt invented; and the celebrated *Caſſini*, the *French* King's Aſtronomer, was the firſt that ſaw all the Satellites of Saturn; which, by reaſon of their great Diſtances from the Sun, and the ſmallneſs of their own Bodies, cannot be ſeen by us, but by the Help of very good Glaſſes.

The Motion of the primary Planets round the Sun (as alſo of the Satellites round their reſpective Primaries) is called their annual Motion; becauſe they have one Year, or the Alterations of the Seaſons, to complete in one of thoſe Revolutions. Beſides their annual Motion, four of the Planets, *viz. Venus*, the *Earth*, *Mars* and *Jupiter*, revolve about their own Axis, from Weſt to Eaſt; and this is called their diurnal Motion. For, by this Rotation, each Point of their Surface is carried ſucceſſively towards, or from the Sun, who always illuminates the Hemiſphere which is next to him, the other remaining obſcure: And, while any Place is in the Hemiſphere illuminated by the Sun, it is Day; but when it is carried to the obſcure Hemiſphere, it becomes Night; and ſo continues until, by this Rotation, the ſaid Place is again enlightened by the Sun.

The *Earth* performs its Revolution round its Axis in 23 Hours 56 Minutes; *Venus*, in 23 Hours; *Mars* in about 24 Hours and 40 Minutes; and *Jupiter* moves around his own Axis in 9 Hours and 56 Minutes.

The Sun is alſo found to turn round his Axis from Weſt to Eaſt in 27 Days; and the Moon which is neareſt to us of all the Planets, revolves about her Axis in a Month, or in the Space of Time that ſhe turns round the Earth; ſo that the Lunarians have but one Day throughout their Year.

The Planets are all opaque Bodies, having no Light but what they borrow from the Sun; for that Side of them, which is next towards the Sun, has always been obſerved to be illuminated, in what Poſition ſoever they be; but the oppoſite Side, which the Solar Rays do not reach, remains dark and obſcure; whence it is evident that they have no Light but what proceeds from the Sun, for if they had, all Parts of them would be lucid, without any Darkneſs or Shadow. The Planets are likewiſe proved to be globular becauſe, let what part ſoever of them be turned towards the

Sun, its Boundary, or the Line ſeparating that Part from the oppoſite, always appears to be circular; which could not happen if they were not globular.

The *Earth* is placed betwixt the Orbs of *Mars* and *Venus*; and *Mercury*, *Venus*, *Mars*, *Jupiter*, and *Saturn*, do all turn round the Sun; both which may be proved from Obſervations, as follows;

1. Whenever *Venus* is in Conjunction with the Sun, that is, when ſhe is in the ſame Direction from the *Earth*, or towards the ſame Part of the Heavens the Sun is in, ſhe either appears with a bright and round Face, like a full Moon, or elſe diſappears; or, if ſhe is viſible, ſhe appears horned like a new Moon; which Phœnomena could never happen, if *Venus* did not turn round the Sun, and was not betwixt him and the *Earth*: for ſince all the Planets borrow their Light from the Sun, it is neceſſary that *Venus*'s lucid Face ſhould be towards the Sun; and when ſhe appears fully illuminated, ſhe ſhews the ſame Face to the Sun and the Earth; whence, at that Time, ſhe muſt be above or beyond the Sun, for in no other Poſition could her illuminated Face be wholly ſeen from the Earth. Farther, when ſhe diſappears; or, if viſible, appears horned; that Face of hers, which is towards the Sun, is either wholly turned from the Earth, or only a ſmall Part of it can be ſeen by the Earth; and in this Caſe ſhe muſt of Neceſſity be betwixt us and the Sun.

Beſides the foregoing, there is another Argument to prove, that *Venus* turns round the *Sun* in an Orbit that is within the Earth's; becauſe ſhe is always obſerved to keep near the *Sun*, and in the ſame Quarter of the Heavens that ſhe is in, never receding from him more than about $\frac{1}{8}$ of a whole Circle; and therefore ſhe can never come in Oppoſition to him, which would neceſſarily happen, did ſhe perform her Courſe round the Earth either in a longer or ſhorter Time than a Year.

And this is the Reaſon why *Venus* is never to be ſeen near midnight, but always either in the Morning or Evening, and at moſt not above three or four Hours before Sun-riſing, and after Sun-ſetting from the Time of *Venus*'s ſuperior Conjunction (or when ſhe is above the *Sun*) ſhe is more eaſterly than the Sun, and therefore ſets later, and is ſeen after Sun-ſetting; and then ſhe is commonly called the *Evening Star*: but from the Time of her inferior Conjunction,

junction, till ſhe comes again to the ſuperior, ſhe then appears more weſterly than the Sun, and is only to be ſeen in the morning before Sun riſing; and is then called the *Morning Star*.

After the ſame Manner, we prove that *Mercury* turns round the Sun, for he always keeps in the Sun's Neighbourhood, and never recedes from him ſo far as *Venus* does; and therefore the Orbit of Mercury muſt lie within that of *Venus*, and on Account of his nearneſs to the Sun, he can ſeldom be ſeen without a Teleſcope.

*Mars* is obſerved to come in Oppoſition, and likewiſe to have all other Aſpects with the Sun; he always preſerves a round, full, and bright Face, except when he is near his quadrate Aſpect, when he appears ſomewhat gibbous, like the Moon, three or four Days before or after the Full: Therefore the Orbit of *Mars* muſt include the Earth within it, and alſo the Sun; for if he was betwixt the Sun and us at the Time of his inferior Conjunction, he would either quite diſappear, or appear horned, as *Venus* and the Moon do in that Poſition.

*Mars*, when he is in Oppoſition to the Sun, looks almoſt ſeven Times larger in Diameter, than when he is in Conjunction with him; and, therefore, muſt needs be almoſt ſeven Times nearer to us, in one Poſition, than in the other: For the apparent Magnitudes of diſtant Objects increaſe, or decreaſe, in Proportion to their Diſtances from us; but *Mars* keeps always, nearly, at the ſame Diſtance from the Sun, therefore, it is plain, that it is not the Earth but the Sun that is the Centre of his Motion.

It is proved, in the ſame Way, that *Jupiter* and *Saturn* have both the Sun and Earth within their Orbits; and that the Sun, and not the Earth, is the Centre of their Motions; although the Diſproportion of the Diſtances from the Earth, is not ſo great in *Jupiter* as in *Mars*, nor ſo great in *Saturn* as it is in *Jupiter*, by reaſon that they are at a much greater Diſtance from the Sun.

We have now ſhewn that all the Planets turn round the Sun, and that *Mercury* and *Venus* are included between him and the Earth, whence they are called the inferior Planets, and that the Earth is placed between the Orbits of *Mars* and *Venus*, and therefore included within the Orbits of *Mars*, *Jupiter* and *Saturn*, whence they are called the ſuperior Planets: And ſince the Earth is in the Middle of theſe moveable Bodies, and is of the ſame Nature with them, we may conclude, that ſhe has the ſame Sort of Motions; but that ſhe turns round the *Sun* is proved thus:

All the Planets ſeen from the Earth appear to move very unequally; as ſometimes to go faſter, at other Times ſlower, and ſometimes to be ſtationary, or not to move at all; which could not happen if the Earth ſtood ſtill.

The annual Periods of the Planets round the Sun are determined, by carefully obſerving the Length of Time ſince their Departure from a certain Point to the Heavens (or from a fixed Star) until they arrived at the ſame again. By theſe Sorts of obſervations, the Ancients determined the periodical Revolutions of the Planets round the Sun; and were ſo exact in their Computations, as to be capable of predicting Eclipſes of the Sun and Moon: But ſince the Invention of Teleſcopes, aſtronomical Obſervations are made with greater Accuracy, and of conſequence our Tables are far more perfect than thoſe of the Ancients.

And, in order to be as exact as poſſible, Aſtronomers compare Obſervations made at a great Diſtance of Time from one another, including ſeveral Periods; by which Means the Error that might be in the whole, is in each Period ſubdivided into ſuch little Parts, as to be very inconſiderable. Thus the mean Length of a ſolar Year is known even to Seconds.

The diurnal Rotation of the Planets round their Axis was diſcovered by certain Spots, which appear on their Surfaces: Theſe Spots appear firſt on the Margin of the Planets diſks (or the Edge of their Surfaces) and ſeem by Degrees to creep towards their Middle; and ſo on, going ſtill forward, till they come to the oppoſite Side or Edge of the Diſk, where they ſet or diſappear; and after they have been hid for the ſame Space of Time that they were viſible, they again appear to riſe, in or near the ſame Place as they did at firſt; then to creep on progreſſively, taking the ſame Courſe as they did before. Theſe Spots have been obſerved on the Surfaces of the *Sun*, *Venus*, *Mars*, and *Jupiter*, by which Means it has been found, that theſe Bodies turn round their own Axis in the Times before mentioned.

It is very probable, that *Mercury* and *Saturn* have likewiſe a Motion round their Axis, that all the Parts of their

Surface may alternately enjoy the Light and Heat of the Sun, and receive ſuch Changes as are proper and convenient for their Nature; but by reaſon of the Nearneſs of *Mercury* to the Sun, and *Saturn's* immenſe Diſtance from him, no Obſervation has hitherto been made, whereby their Spots (if they have any) could be diſcovered, and therefore their diurnal Motions cannot be determined. The diurnal Motion of the Earth is concluded to exiſt from the apparent Revolution of the Heavens, and of all the Stars round it, in the Space of a natural Day. For it is much eaſier to conceive, that this comparatively ſmall Globe, ſhould turn round its own Axis, once in 24 Hours, than that ſuch a great Number of much larger Bodies, ſome of them ſo immenſely diſtant, ſhould revolve round it in ſo ſhort a Space of Time. The ſolar Spots do not always remain the ſame, but ſometimes old ones vaniſh and afterwards others ſucceed in their Room; ſometimes ſeveral ſmall ones gather together and make one large Spot, and ſometimes a large Spot is ſeen to be divided into many ſmall ones. But notwithſtanding theſe Changes, they all turn round with the Sun in the ſame Time.

Each Planet is obſerved always to paſs through the Conſtellations *Aries*, *Taurus*, *Gemini*, *Cancer*, *Leo*, *Virgo*, *Libra*, *Scorpia*, *Sagittarius*, *Capricornus*, *Aquarius*, *Piſces*, and it alſo appears that every one has a Track peculiar to itſelf; whereby the paths of the ſix Planets form, among the Stars, a Kind of Road, which is called the Zodiac; the middle Part whereof, called the Ecliptic, is the Orbit deſcribed by the Earth, with which the Orbits of the other Planets are compared.

As the Ecliptic runs through twelve Conſtellations, it is ſuppoſed to be divided into twelve equal Parts, of 30 Degrees each, called Signs, having the ſame Names with the twelve Conſtellations they run through.

The Plane of the Ecliptic is ſuppoſed to divide the celeſtial Sphere in two equal Parts, called the Northern and Southern Hemiſpheres; and a Body ſituated in either of theſe Hemiſpheres, is ſaid to have North or South Latitude according to the Hemiſphere it is in: So that the Latitude of a celeſtial object is its neareſt Diſtance from the Ecliptic.

The Planes of the other five Orbits are obſerved to lie partly in the Northern and partly in the Southern Hemiſphere; ſo that every one cuts the Ecliptic in two oppoſite Points called Nodes; one, called the aſcending Node, is that through which the Planet paſſes, when it moves out of the Southern into the Northern Hemiſphere; and the other called the deſcending Node, is that through which the Planet muſt paſs, in going out of the Northern into the Southern Hemiſphere.

The right Line joining the two Nodes of any Planet is called the Line of the Nodes.

The Names of moſt of the Conſtellations were given by the ancient Aſtronomers who reckoned that Star in *Aries*, now marked ♈ (according to *Bayter*) to be thefirſt Point in the Ecliptic, this for being next the Sun when he entered the vernal Equinox; and at that time each Conſtellation was in the Sign by which it was called; but Obſervations ſhew, that the Point marked in the Heavens by the vernal Equinox, has been conſtantly going backwards, by a ſmall Quantity every year; whereby the Stars appear to have advanced as much forwards, ſo that the Conſtellation *Aries* is now almoſt removed into the Sign *Taurus*; the ſaid firſt Star in *Aries* being got almoſt 30 Degrees forward from the Equinox; which Difference is called the *Proceſſion of the Equinox*, whereof the yearly Alteration is about 50 Seconds of a Degree, or about a Degree in 72 Years.

All the Planets have one common Focus, in which the Sun is placed; for as no other Suppoſition can ſolve all the Appearances that are obſerved in the Motion of the Planets, and as it alſo agrees with the ſtricteſt phyſical and mathematical Reaſon; therefore it is now received as an elementary Principle.

The Line of the Nodes of every Planet paſſes through the Sun; for as the Motion of every Planet is in a Plane paſſing through the Sun, conſequently the Interſections of theſe Planes, that is in the Lines of the Nodes, muſt alſo paſs through the Sun.

All the Planets in their Revolutions are ſometimes nearer, ſometimes farther from the Sun; this is a Conſequence of the Sun not being placed in the Centre of each Orbit, the Orbits being Ellipſes.

The Aphelion, or ſuperior Apſis, is that Point of the Orbit which is fartheſt diſtant from the Sun: And the Perihelion, or inferior Apſis, is that Point which is neareſt the Sun: And the tranſverſe Diameter of the Orbit, or the Line joining the two Apſes, is called the Line of the Apſes, or Apſides.

The Planets move faſter as they approach the Sun, or come nearer to the Perihelion, and ſlower as they recede from the Sun, or come nearer the Aphelion. This is not only a conſequence from the nature of the Planets motions about the Sun, but it is confirmed by all good Obſervations.

If a right Line be drawn from the Sun, through any Planet, (which Line is called by ſome the *Vector Radius*) and be ſuppoſed to revolve round the Sun with the Planet, then this Line will deſcribe, or paſs through every Part of the Plane of the Orbit, ſo that the Vector Radius may be ſaid to deſcribe the Area of the Orbit.

There are two chief Laws obſerved in the Solar Syſtem which regulate the motion of all the Planets; namely,

I. The Planets deſcribe equal Areas in equal Times; that is in equal Portions of Time the Vector Radius deſcribes the equal Areas or Portions of the Space contained within the Planet's Orbit.

II. The Squares of the periodical Times of the Planets are as the Cubes of the main Diſtance from the Sun: That is, as the Square of the Time which the Planet *A* takes to revolve in its Orbit, is to the Square of the Time taken by any other Planet *B*, to run through its Orbit; ſo is the Cube of the main Diſtance of *A* from the Sun, to the Cube of the main Diſtance of *B* from the Sun.

The main Diſtance of a Planet from the Sun is its Diſtance from him, when the Planet is at either Extremity of the conjugate Diameter, and is equal to Half of the tranſverſe Diameter.

The foregoing Laws are the two famous Laws of *Kepler*, a great Aſtronomer, who flouriſhed in *Germany* about the Beginning of the 17th Century, and who deduced them from a Multitude of Obſervations: But the firſt who demonſtrated theſe Laws, was the incomparable Sir *Iſaac Newton*.

By the ſecond Law, the relative Diſtances of the Planets from the Sun are known; and was the real Diſtance of any one known, the abſolute Diſtances of all the others would thereby be obtained.

Beſides the Planets already mentioned, there are other great Bodies, that ſometimes viſit our Syſtem, which are a Sort of temporary Planets; for they come and abide with us for a while, and afterwards withdraw from us for a certain Space of Time, after which they again return. Theſe wandering Bodies are called Comets.

The Motion of the Comets in the Heavens, according to the beſt Obſervations hitherto made, ſeem to be regulated by the ſame immutable Law with the Planets; for their Orbits are elliptical, like thoſe of the Planets, but vaſtly narrower or more eccentric. Yet they have not at all the ſame Direction with the Planets, who move from Weſt to Eaſt, for ſome of the Comets move from Eaſt to Weſt; and their Orbits have different Inclinations to the Earth's Orbit; ſome inclining Northwardly, others Southwardly, much more than any of the planetary Orbits do.

Although both the Comets and the Planets move in elliptic Orbits, yet their Motions ſeem to be vaſtly different, for the Eccentricities of the Planets Orbits are ſo ſmall, that they differ but little from Circles; but the Eccentricities of the Comets are ſo very great, that the Motions of ſome of them ſeem to be almoſt in a right Line, tending directly towards the Sun.

Now, ſince the Orbits of the Comets are ſo extremely eccentric, their Motions when they are in their Perihelia, or neareſt Diſtance from the Sun, muſt be much ſwifter, than when they are in their Aphelia, or fartheſt Diſtance from him; which is the Reaſon why the Comets make ſo ſhort a Stay in our Syſtem, and, when they diſappear, are ſo long in returning.

The Figures of the Comets are obſerved to be very different; ſome of them ſend forth ſmall Beams, like Hair, every way round them; others are ſeen with a long fiery Tail, which is always oppoſite to the Sun. Their Magnitudes are alſo very different, but in what Proportion they exceed each other, is as yet uncertain. Nor is it probable that their Numbers are yet known, for they have not been obſerved with due Care, nor their Theories diſcovered, but of late Years. The Ancients were divided in their Opinions concerning them; ſome imagined that they were only a Kind of Meteors, kindled in our Atmoſphere, and were there again diſſipated; others took them to be ſome ominous Prodigies; but modern Diſcoveries, prove, that they are Worlds, ſubject to the ſame Laws of Motion as the Planets are; and they muſt be very hard and durable Bodies, elſe they could not bear the vaſt Heat which ſome of them, when in their Perihelia, receive from the Sun, without being utterly conſumed. The great Comet, which appeared in the Year 1680, was within $\frac{1}{6}$ part of the Sun's Diameter from his ſurface; and therefore its Heat muſt be prodigiouſly intenſe, beyond Imagination: And when it is at its greateſt Diſtance from the Sun, the Cold muſt be as rigid.

The fixed Stars are thoſe bright and ſhining Bodies which, in a clear Night, appear to us every where diſperſed through the boundleſs Regions of Space. They are termed fixed, becauſe they are found to keep the ſame immutable Diſtance, in all Ages, without having the Motions obſerved in the Planets. The fixed Stars are all placed at ſuch immenſe Diſtances from us, that the beſt of Teleſcopes repreſent them no bigger than Points, without having any apparent Diameter.

It is evident from hence, that all the Stars are luminous Bodies, and ſhine with their own proper and native Light, elſe they could not be ſeen at ſuch a great Diſtance. For the Satellites of *Jupiter* and *Saturn*, though they appear under conſiderable Angles through good Teleſcopes, yet are altogether inviſible to the naked Eye.

Although the Diſtance betwixt us and the Sun is vaſtly large, when compared to the Diameter of the Earth, yet it is nothing when compared with the prodigious Diſtance of the fixed Stars; for the whole Diameter of the Earth's annual Orbit appears from the neareſt fixed Star no bigger than a point, and the fixed Stars are at leaſt 100,000 times farther from us than we are from the Sun; as may be demonſtrated from the Obſervations of thoſe who have endeavoured to find the Parallax of the Earth's annual Orbit, or the Angle under which the Earth's Orbit appears from the fixed Stars.

Hence it follows, that though we approach nearer to ſome fixed Star at one Time of the Year than we do at the oppoſite, and that by the whole Length of the Diameter of the Earth's Orbit; yet this Diſtance, being ſo ſmall in compariſon with the Diſtance of the fixed Stars, their Magnitudes or Poſitions cannot thereby be ſenſibly altered. Therefore we may always without Error ſuppoſe ourſelves to be in the ſame Centre of the Heavens, ſince we have always the ſame viſible Proſpect of the Stars without any Alteration.

If a Spectator was placed as near to any fixed Star as we are to the *Sun*, he would there obſerve a Body as big, and every way like, as the Sun appears to us; and our Sun would appear to him no bigger than a fixed Star, and undoubtedly he would reckon the Sun as one of them, in numbering the Stars. Wherefore ſince the Sun differeth in nothing from a fixed Star, the fixed Stars may be reckoned as ſo many Suns.

It is not reaſonable to ſuppoſe that all the fixed Stars are placed at the ſame Diſtance from us; but it is more probable that they are every where interſperſed, through the vaſt indefinite Space of the Univerſe; and that there may be as great a Diſtance betwixt any two of them as there is betwixt our Sun and the neareſt fixed Star. Hence it follows, why they appear to us of different Magnitudes, not becauſe they really are ſo, but becauſe they are at different Diſtances from us; thoſe that are neareſt excelling in Brightneſs and Luſtre thoſe that are more remote, who give a fainter Light, and appear ſmaller to the Eye.

The Aſtronomers diſtribute the Stars into ſeveral Orders or Claſſes; thoſe that are neareſt to us, and appear brighteſt to the Eye, are called Stars of the firſt Magnitude; thoſe that are neareſt to them in Brightneſs and Luſtre are called Stars of the ſecond Magnitude; thoſe of the third Claſs are ſtiled Stars of the third Magnitude; and ſo on, until we come to the Stars of the ſixth Magnitude, which are the ſmalleſt that can be diſcerned by the naked Eye. There are infinite Numbers of ſmaller Stars, that can be ſeen through Teleſcopes; but theſe are not reduced to any of the ſix Orders, and are only called Teleſcopic Stars. It may be here obſerved, that though the Aſtronomers have reduced all the Stars, that are viſible to the naked Eye, into ſome one or other of theſe Claſſes; yet we are not to conclude from thence that all the Stars anſwer exactly to ſome or other of theſe Orders; but there may be in Reality as many Orders of the Stars as they are in Number, few of them appearing of the ſame Bigneſs and Luſtre.

The ancient Aſtronomers, that they might diſtinguiſh the Stars in regard to their Situation and Poſition to each other, divided the whole ſtarry Firmament into ſeveral Aſteriſms or Syſtems of Stars, conſiſting of thoſe that are near to one another. Theſe Aſteriſms are called Conſtellations, and are digeſted into the forms of ſome Animals,

mals, as Men, Lions, Bears, Serpents, *&c.* or to the Images of ſome known Things, as of a Crown, a Harp, a Triangle, *&c.*

The ſtarry Firmament was divided by the Ancients into 48 Images or Conſtellations; twelve of which they placed in that Part of the Heavens wherein are the Planes of the planetary Orbits; which Part is called the Zodiac, becauſe ſome of the Conſtellations, placed therein, reſemble ſome ſtrong Creature. The two Regions of the Heavens on each ſide of the Zodiac, are called the North and South Parts of the Heavens.

The Conſtellations within the Zodiac are, 1. *Aries* ♈, the Ram; 2. *Taurus* ♉, the *Bull*; 3. *Gemini* ♊, the Twins; 4. *Cancer* ♋, the *Crab*; 5. *Leo* ♌, the Lion; 6. *Virgo* ♍, the Virgin; 7. *Libra* ♎, the Balance; 8. *Scorpio* ♏, the Scorpion; 9. *Sagittarius* ♐, the Archer; 10. *Capricornus* ♑, the Goats; 11. *Acquarius* ♒, the Water bearer; and, 12, *Piſces* ♓, the Fiſhes.

The Conſtellations on the North-ſide of the Zodiac are thirty-ſix, *viz.* the *Little Bear*, the *Great Bear*, the *Dragon*, *Cæpheus*, a King of *Ethiopia*; the *Greyhounds*; *Bootes*, the Keeper of the Bear; *Mons Menelaus*; *Berenice's Hair*; *Charles's Heart*; the *Northern Crown*; *Hercules* with his Club watching the Dragon; *Cerberus*, the *Harp*; the *Swan*; the *Fox*; the *Gooſe*; the *Lizard*; *Caſſiopeia*; *Perſeus*; *Andromeda*; the *Great Triangle*; the *Little Triangle*; *Auriga*; *Pegaſus*, or the *Flying Horſe*; the *Dolphin*; the *Arrow*; the *Eagle*; *Serpentarius*; the *Serpent*; *Sobieſki's Shield*; *Camelopardus*; *Antinous*; the *Colt*; the *Lynx*; the *Little Lion*; and *Muſca*.

The Conſtellations noted by the Ancients on the South Side of the Zodiac, were the *Whales*, the *River Eridanus*, the *Hare*, *Orion*, the *Great Dog*, *Little Dog*, the *Ship Argo*, *Hydra*, the *Centaur*, the *Cup*, the *Crow*, the *Wolf*, the *Altar*, the *Southern Crow*, and the *Southern Fiſh*. To theſe have been lately added the following, *viz.* The *Phœnix*, the *Crane*, the *Peacock*, *Noah's Dove*, the *Indian*, the *Bird of Paradiſe*, *Charles's Oak*, the *Southern Triangle*, the *Fly* or *Bee*, the *Swallow*, the *Chamelion*, the *Flying Fiſh*, *Teucan*, or the *American Gooſe*, the *Water Serpent*, and the *Seward Fiſh*.

The Ancients placed theſe particular Conſtellations or Figures in the Heavens, either to commemorate the Deeds of ſome great Man, or of ſome notable Exploit or Action; or elſe took them from the Fables of their Religion, &c. And the modern Aſtronomers do ſtill retain them, to avoid the Confuſion that would ariſe by making new ones, when they compare the modern Obſervations with the old ones.

Some of the principal Stars have particular Names given them, as *Syrius*, *Arcturus*, &c. There are alſo ſeveral Stars that are not reduced into Conſtellations, and theſe are called unformed Stars.

Beſides the Stars viſible to the naked Eye, there is a very remarkable Space in the Heavens, called the *Galaxy* or *Milk Way*. This is a broad Circle of a whitiſh Hue, like Milk, going quite round the whole Heavens, and conſiſting of an infinite Number of ſmall Stars, viſible through a Teleſcope, though not diſcernible by the naked Eye, by reaſon of their exceeding Faintneſs; yet, with their Light they combine to illumine that Part of the Heavens where they are, and to cauſe that ſhining Whiteneſs.

The Places of the fixed Stars, or their relative ſituations one from another, have been carefully obſerved by Aſtronomers, and digeſted into Catalogues. The firſt among the *Greeks*, who reduced the Stars into a Catalogue, was *Hipparchus*, who from his own Obſervations, and of thoſe who lived before him, inſerted 1022 Stars in his Catalogue about 120 Years before the Chriſtian Æra; this Catalogue has been ſince enlarged and improved, by ſeveral learned Men, to the Number of 3000, of which there are a great many teleſcopical, and not to be diſcerned by the naked Eye; and theſe are all ranked in the Catalogue as Stars of the ſeventh Magnitude.

It may ſeem ſtrange to ſome, that there are no more than this Number of Stars viſible to the naked Eye; for ſometimes, in a clear Night, they ſeem to be innumerable. But this is only a Deception of our Sight, ariſing from their vehement Sparkling, while we look upon them confuſedly without reducing them into any Order; for there can ſeldom be ſeen above 1000 Stars in the whole Heavens with the naked Eye, at the ſame Time; and if we ſhould diſtinctly view them, we ſhall not find many but what are inſerted upon a good celeſtial Globe.

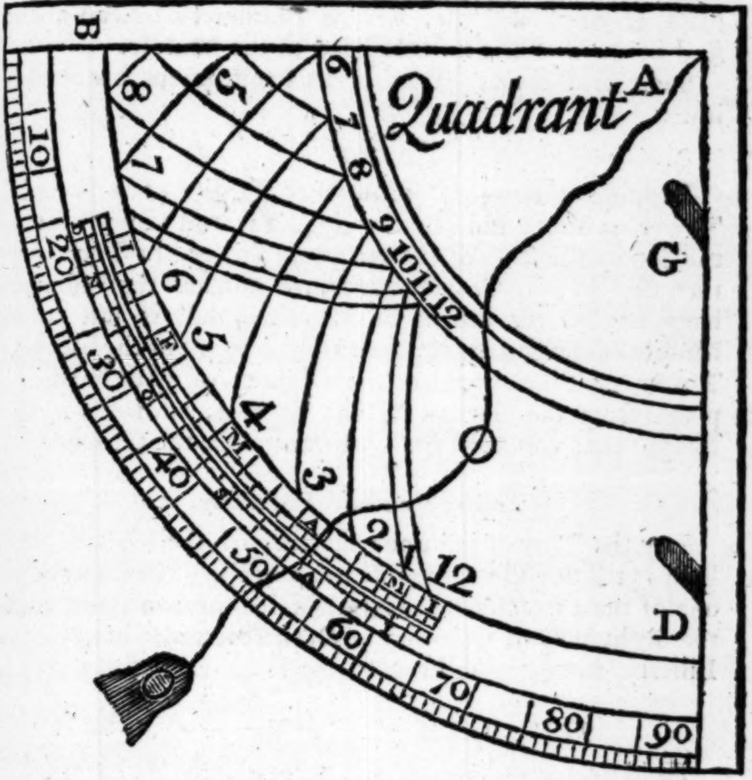
Although the Number of Stars that can be diſcerned by the naked Eye are ſo few, yet it is probable there are many more which are beyond the Reach of our Optics; for through Teleſcopes, they appear in vaſt Multitudes; every where diſperſed, throughout the whole Heavens; and the better our Glaſſes are, the more of them we will diſcover. The ingenious Dr. *Hook* has obſerved 74 Stars in the *Pleiades*, of which the naked Eye is never able to diſcern above 7; and in the *Orion*, which has but 80 Stars in the *Britiſh* Catalogue (and ſome of them teleſcopical) there has been numbered 2000 Stars.

Thoſe who think that all thoſe glorious Bodies were created for no other Purpoſe than to give us a little dim Light, muſt entertain a very ſlight Idea of the Divine Wiſdom; for we receive more Light from the Moon itſelf, than all the Stars put together.

And ſince the Planets are ſubject to the ſame Laws of Motion with our Earth, and ſome of them not only equal to, but vaſtly exceed it in Magnitude, it is not unreaſonable to ſuppoſe that they are all habitable Worlds. And ſince the fixed Stars are no ways behind our Sun, either in Bigneſs or Luſtre; is it not probable that each of them have a Syſtem of Planetary Worlds turning round them, as we do round our Sun? and if we aſcend as far as the ſmalleſt Star we can ſee, ſhall we not then diſcover innumerably more of theſe glorious Bodies, which are now altogether inviſible to us? And *ad infinitum*, through the boundleſs Space of the Univerſe. What a magnificent Idea muſt this raiſe in us of the Divine Being! who is every where, and at all Times preſent, diſplaying his Divine Power, Wiſdom and Goodneſs, amongſt all his Creatures!

The next Thing I ſhall proceed to is, to ſay ſomething in relation to the Art of making Dials: but it may be proper to deſcribe and ſpeak of the Uſe of a very neceſſary Inſtrument called a *Quadrant*, the ſhape of which is here repreſented.

This



This Quadrant, or Quarter of a Circle, is variouſly uſeful on ſundry Accounts, *viz.* to take Heights and Diſtances, whether acceſſible or inacceſſible: To find the Hour of the Day, *&c.*

*Its Deſcription.*

The outward Arc is divided into 90 Parts or Degrees (being the fourth Part of the Circle of the Sphere) and figured from 10, 20, *&c.* to 90; above which Figures are Letters ſignifying the 12 Calendar Months in the Year; as *J.* for *January*, *F.* for *February*, *&c.* And again over thoſe Letters for the Months are Lines to know the Hour of the Day: And upon the Line *GD*, are Sights of thin Braſs to be ſpied through, or for the Sun to ſhine through, from one to the other. Laſtly, in the Middle or Point of the Quadrant, *viz.* at *A.* is a Line or Thread of Silk, fixed, through a Hole, with a Plummet of Lead at the End of it, and alſo a ſmall Bead in the Middle.

Some of the many Uſes of this Inſtrument are as follow:

### *Of Heights.*

Suppoſe you would know the Height of a Steeple, Tower or Tree; hold up the Quadrant, and view through the Sights the Top of the Steeple, Tower, or Tree, and then ſtep forward or backwards, till you find the Plummet hang at Liberty juſt at 45 Degrees, that is juſt in the Middle of the Quadrant; then is the Height of the Steeple, Tower, or Tree, equal to the Diſtance of your ſtanding-place from the Bottom of the Steeple, adding for the Height that you hold the Quadrant from the Ground.

### *To find the Hour of the Day.*

Lay the Thread juſt upon the Day of the Month, then hold it till you ſlip the ſmall Bead or Pin's Head to reſt on one of the 12 o'clock Lines; then let the Sun ſhine from the Sight at *G* to the other at *D*, the Plummet hanging at Liberty, the Bead will reſt on the Hour-line of the Day.

### *To find the Latitude of a Place nearly.*

Hold up the Quadrant, and through the Sights thereof (or along the Edge) ſpy, in a clear Star-light Night, the North Pole Star; the Plummet hanging at Liberty, the Thread will reſt on the Degrees of Latitude of the Place you are in, or where you take your Obſervation.

### *Of Dialling.*

DIALLING is a very ancient Art, even as old as the Time of King *Hezekiah*, where mention is made of the Dial of *Ahaz*, in the 2d Book of *Kings*, Chap. xx. ver. 11.

The Gnomon or Subſtile of a Poſt or Horizontal Dial ſhould point directly South, and its Back will be then directly North, the South may be truly known by a good Watch or Clock, juſt at Noon; for then the Sun is always at the Meridian, and makes juſt 12 o'Clock; ſo that knowing the South, it will not be difficult to find the North, it being its Oppoſite.

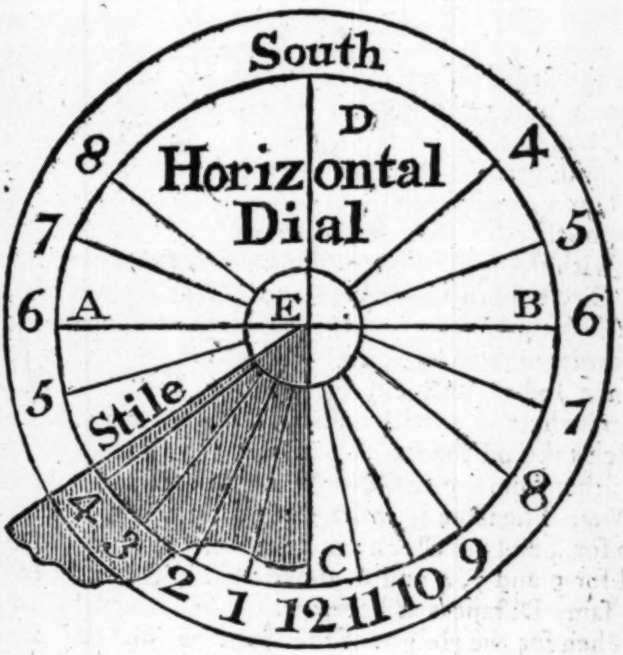
To

### *To fix a Dial North and South.*

Faſten your Board on the Top of a Poſt, and then with your Compaſs make 4, or 5, or 9 Circles, one within the other from the Centre or Middle, where place a large pin perpendicular or upright; and nicely obſerve, when the Sun ſhines in the Forenoon, on which Circle the Head of the Pin ſhadoweth; then there make a Mark; and do the ſame in the Afternoon, when the Shade of the Pin's-head comes on the ſame Circle; and from the Midway of the two marks draw a Line to the Centre, on which place your Meridian or 12 o'clock Line; ſo will the Poſt Dial point North and South.

By a Meridian Line you may alſo know when the Moon, or a Star of Magnitude, comes to the South; which when they do, they are always at the higheſt, whether by Night or Day.

The following Figure repreſents a Horizontal-dial.



Firſt with a Ruler draw the Line *A B*, then croſs it in the Centre with another Line as the Line *C D*, which is the Meridian or 12 o'clock Line: and the firſt Line drawn, *viz.* *AB.* is the ſix o'clock Line: Then open your Compaſſes, and place one Foot at the Beginning of the Degrees, or the Arc Edge of your Quadrant; and extend the other Foot to 60 Degrees, and with that Extent place one Foot in the Centre of the Dial at *E,* where the two firſt Lines croſs one another, and draw the Semicircle *ACB.*

Next having the 12 o'Clock Line *EC,* to know what Diſtance muſt be ſet off from it, for 1 o'Clock and 11 o'Clock, being all one; be directed by the following ſmall Table, *viz.*

| 52° | | Lat. | |
|---|---|---|---|
| D. | M. | Hour. | |
| 11 | 55 | 1 | 11 |
| 24 | 26 | 2 | 10 |
| 38 | 13 | 3 | 9 |
| 53 | 44 | 4 | 8 |
| 71 | 9 | 5 | 7 |

In the firſt Column againſt 1 Hour and 11, you find 1 Degrees and 55 Minutes; which take off the Edge o the Quadrant, by ſetting one Foot of the Compaſſes at th Beginning of the Diviſion under *B,* and the other Foot t 11 Degrees 53 Minutes; the Compaſſes ſo opened ſet one Foot in the Circle at the Bottom of the 12 o'clock Line, and with the other Foot of the Compaſſes make a Mark in the Circle both towards *A* and *B,* and from thoſe two Marks draw Lines towards the Centre, which you may afterwards go over with Ink. Then to make the Hour Lines from 2 and 10 o'Clock, look on the Table for 2 and 1 Hours where you will find 24 Degrees and 26 Minutes which take off the Degrees of your Quadrant, and mark a the other from the 12 o'Clock Line both Ways in the Circle

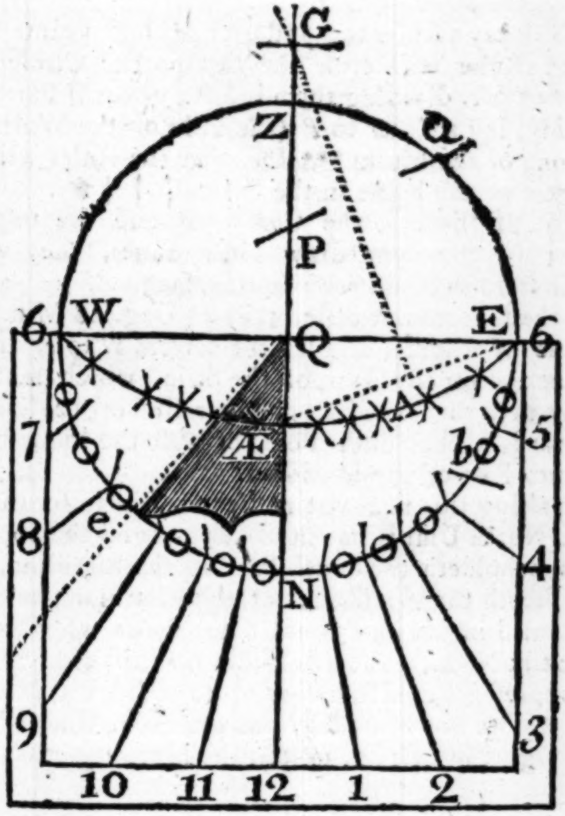
*Note,* The ſame is to be done for 3 and 9 o'Clock, and alſo for 4 and 8 o'Clock; and the like for 5 and 7 o'Clock and for 5 and 7, 4 and 8, above the 6 o'Clock Line, ſet of the ſame Diſtances as below it.

Then for the Height of the Gnomon, or Stile, admit 5 Degrees, take it off the Edge of the Quadrant with th Compaſſes as before, and with that Extent ſet one Foot a Bottom of the 12 o'Clock Line as before, and extend th other Foot in the Circle, and make a Mark, and then draw a Line from thence to *E* the Centre, for the upper Edge of the Stile, and ſo raiſe it directly over the Meridian of the 12 o'Clock Line.

## *Of Upright Planes.*

Thoſe Planes are ſaid to be erect or upright which ſtand perpendicular to the Horizon of the Place, whoſe upper Part pointeth to the Zenith, and their lower Part to the Nadir; and ſuch are the Walls of Houſes, Churches, Steeples, &c. againſt which Dials are commonly made.

How to draw the Hour Lines on a direct South Plane, in the Latitude of 51 Deg. 32 Min. is deſcribed by the following Repreſentation.



Firſt draw the Circle *ZEWN*, repreſenting an upright direct South Plane; next croſs it with the Diameters *ZQN* for the Meridian or 12 o'Clock Line; and *WQE* for the Prime Vertical Circle, or Hour-line of Six.

Secondly out of your Line of Chords take 38 Degrees 28 Minutes (the Complement of the Latitude of the Place) and ſet that Diſtance on the Dial-Plane from *Z* to *a*, and from *E* to *b*, and from *N* to *e*.

Thirdly lay a Ruler from *W* to *a*, and it will cut the Meridian *ZN* in the Point *P*, the Pole of the World; and a Ruler alſo laid from *W* to *b* will cut the Meridian in *Æ*, which is the Point through which the Equinoctial muſt paſs; for the Drawing of which you have three Points given, *viz.* *E Æ* and *W*, and the Centre will always be in the Meridian Line *ZN*.

Fourthly, divide the Semi-circle *ENW* into 12 equal Parts, as the Points *OOO*, &c.

Fifthly, lay a Ruler to *Q* and each of thoſe Points *OOO*, and the Ruler will croſs the Equinoctial Circle in the Points *** &c. dividing them into 12 unequal Parts.

Sixthly, lay a Ruler to *P* (the Pole of the World) and every one of the Marks *** &c. and the Ruler will croſs the Circle of the Plane in the Points | | | &c.

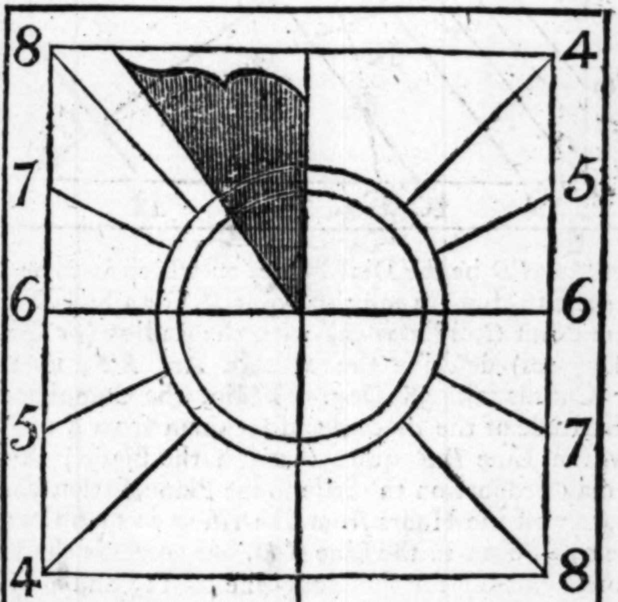
Laſtly, if through the Centre *Q* and the reſpective Points | | | &c. you draw right Lines, they will be true Hour-lines on an erect South-plane.

For the Gnomon or Stile, take 38 Deg. 28 Min. out of the Line of Chords, and ſet them from *N* to *e*, drawing the Line *Qe* for the Axis of the Stile, which muſt hang directly over the Meridian or Hour-line of 12, and point downwards to the South Pole, becauſe the Plane beholds the South Part of the Meridian.

In making this Dial you make two Dials; for the Erect Direct North Dial is but the Back-Side of the South, for as this beholdeth the South Part of the Meridian, ſo the other faceth the North Part of the Meridian; and as the Meridian Line in the South Dial ſhews when it is 12 o'Clock at Noon, ſo the Back-ſide thereof, *viz.* the North Side, repreſents the Hour-line of 12 o'Clock at Midnight, and therefore not expreſſed, nor the Hour-lines of 9, 10, 11 at Night, or of 1, 2, or 3 in the Morning, the Sun being

ing never ſeen by us above the Horizon at thoſe Hours: So that the North dial is capable of only receiving the Hours of 4, 5, 6, 7 and 8 in the Morning, and 4, 5, 6, 7 and 8 at Night, and (in this Latitude) not all of them neither; for it ſhines not in this Plane, at 8 in the Morning, nor at 4 in the Afternoon; but it is beſt to put them down as in the Figure following, to know how much it is paſt in the Morning, and what it wants of 5 in the Afternoon.

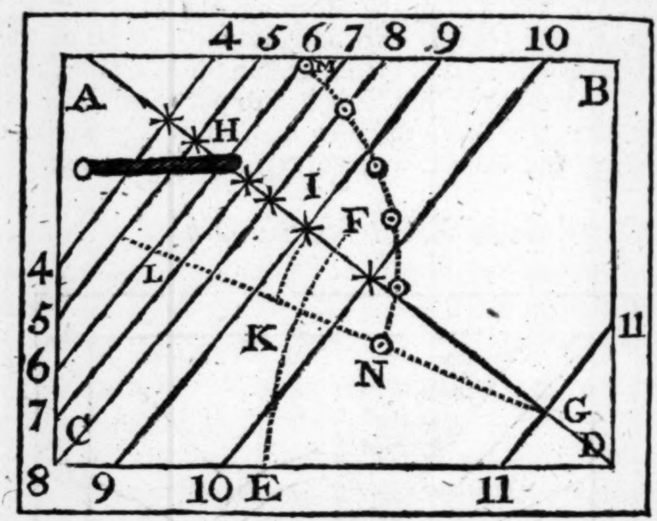
*An Erect North Dial.*



To draw the Hour-lines on an Erect Direct Eaſt or Weſt Plane.——Hour-lines in theſe Dials muſt be paralleled to one another, and the Dial not to have any Centre, but drawn as follows.

Eaſt

### *Eaſt Direct Dial in the Latitude of* 51 *Deg.* 32 *Min.*

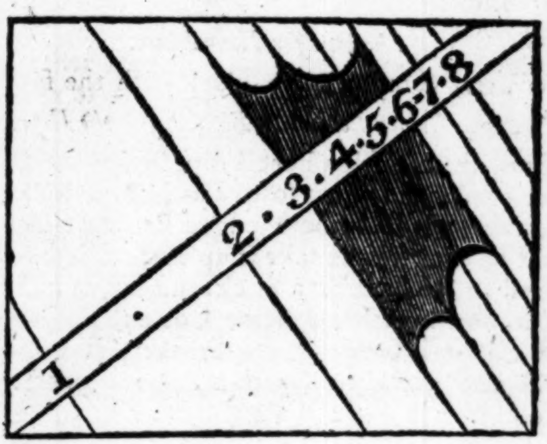


Let *ABCD* be the Dial Plane, on which is to be drawn a direct Eaſt-dial: upon the Point *D*, if an Eaſt Dial, and on the Point *C*, if a Weſt, with the Radius (or Chord of 60 Degrees) deſcribe the obſcure Arc *EF*; then from your Chords take 38 Deg. 28 Min. the Complement of the Latitude of the Place; and ſet them from *E* to *F*; and draw the Line *DF* quite through the Plane; then that you may proportion the Stile to the Plane, ſo that you may bring on all the Hours from Sun-riſing to 11 o'Clock, aſſume two Points in the Line *FD*, one towards the End *D*, (as the Point *G*) for the Hour-line of 11, and another at *H*, for the Hour-line of ſix; and through the Point *G* and *H*, draw the Lines 11 *G* 11, and 6 *H* 6 on the Point *G*, with the Chord of 60 Degrees, deſcribe the obſcure Arc *IK*; and taking 15 Degrees from the Scale of Chords, in the Compaſſes, ſet one Foot in *I*, and with the other cut the Arc *IK* and *E*; through *G* and *K* draw the line *GKL*, cutting the Line 6*H*6 in the point *L*; ſo ſhall *LH* be the Height of the perpendicular ſtile proportioned to this Plane.

For the drawing of the Hour-lines, ſet one Foot of the Compaſſes (opened to 60 Degrees of the Chords) in *L*, and with the other deſcribe the Arc *MN*, between the Hour-line of 6, and the Line *GL*; which divide into five equal Parts in the Points ⊙ ⊙ ⊙ ⊙ ⊙ and a Ruler laid from the Point *L*, to each of theſe Points ⊙ ⊙ ⊙ &c. will cut the Equinoctial Line *HD* in the Points *****; through which Points draw Lines paralleled to 6 *H* 6, as the Lines 7*7, 8*8, &c. as may be ſeen in the Figure.

And thus you have made the Dials, *viz.* a Weſt-Dial as well as an Eaſt; only the Arc *EF*, through which the Equinoctial paſſeth in the Eaſt-dial, is drawn on the right Hand of the Plane; but in the Weſt it muſt be drawn on the left; and the Hour Lines 4, 5, 6, 7, 8, 9, 10, and 11 in the Forenoon, on the Eaſt-dial muſt be 8, 7, 6, 5, 4, 3, 2, and 1 in the Afternoon, upon the Weſt-dial, as in the Figure.

## *An Erect and Direct Weſt Dial.*



The Stile of the Eaſt or Weſt-dials, may be either a ſtraight Pin of the juſt Length of the Line *HO* in the other Figure, which is equal to *HL* fixt in the Point *H*, on the Hour-line of 6, and exactly perpendicular on the Plane, ſhewing the Hours by the Shadow of the Apex, or very near the Top thereof; or it may be a Plate of Braſs of the ſame Breadth with the Diſtance of the Hour-lines of 6 and 3; which Plate muſt be ſet perpendicular upon the Hour-line of 6, and ſo it will ſhew the Hour by the Shadow of the Upper Edge thereof, as in the laſt Figure.

*Of*

### *Of beautifying and colouring Dials.*

FIRST, the Boards are to be bruſhed over with Linſeed Oil, thinly ground with the *Spaniſh* Brown, done over three or four Times (drying between each Time) a little thicker each Time with the Colour; and this is called *Priming*.

### *To make the fat Oil for Dials.*

Boil Red-lead, and Linſeed Oil, and a little Litharge of Gold, (about a Penny-worth) together, 'till almoſt as thick as Syrup; and when cold, and well ſettled, pour the cleareſt into a Bottle or Bladder for uſe.

### *The Gold Size for Dials.*

Mix fine ground yellow Oaker with the aforeſaid fat Oil, to ſuch a Conſiſtency, as when uſed, it may ſettle ſmooth of itſelf.

### *A Mixture for Hour Lines.*

Grind Vermillion or Lamp-black with the fat Oil.

### *To draw Golden Letters or Figures for the Hours.*

Firſt draw them with a Pencil dipt in the Gold Size before mentioned; and when ſo dry as juſt to ſtick to your Fingers, then with a ſmooth edged Penknife ſhape your Leaf-gold to your Mind; take it up with a Piece of Cotton Cloth fixed to the End of a Stick, and lay it on the Size, preſſing it down with the ſame Cotton, and when dry, bruſh off the looſe Gold with a Feather, and ſmooth the rough Edges of the Letters with a Pencil dipped in red or Black Colour.

### *Of the Dial Plane.*

Let the Board be of the beſt ſeaſoned, firmeſt, cleareſt, Oak, one, two, or more Feet ſquare, and about three Inches thick. Take two Boards and get them planed on both Sides, and then laid in the Sun-ſhine, or near a moderate Fire two or three Days together, then plane them again, and fix them with good Joints, and faſten them in gluing with wooden Pegs, as I have ſeen Coopers fix their Pieces of Heading to their Caſks; and when thus glued and dried plane them again, and then faſten them, by nailing two ſmall Plates of Iron or Tin on the Back. If you cannot get ſeaſoned Wood, but green, then boil it about an Hour in Water to make it tough, and keep it from warping. In the general, Wood is accounted better than Stone, becauſe it keeps the Colouring more ſtaunch or firm.

Before you colour your Dial-plate or Board, fix your Iron Stile of 38 Degrees (which indifferently ſerves for all *England)* and having marked your Hour-lines with Ink and faſtened a Nail at the End of each Hour-line, that the Head of each Nail may ſhadow or direct you to the Centre when it is coloured. And as it may happen that Golden Letters or Figures may decay in a few Years, you may on that account make them with a White-Lead Paint, painted with Red in a black Margin. When your Dial is finiſhed, and dry, dip a Feather in your Oil, and anoint it thinly; for the finer you mix or grind the Colouring with the Oil, the more beautiful it appears, though not ſo laſting.

Theſe Hints of colouring Dials, put me in Mind of ſome other very neceſſary Touches relating to ſundry Mixtures of Colours, and dying of Stuffs, *&c.* collected from Mr. *Salmon's Polygraphice.*

### *Of Colours and Dying.*

*Whites,* are Ceruſe, Flake-white, and White-lead.

*Blacks,* are Lampblack, burnt Cherry-ſtones, and old Ivory burnt.

*Reds,* are Red-lead, Vermilion, Red-Oaker and Indian Lake.

*Greens,* are Verdigreaſe, Verditure, and Sap-green made of the Juice of Buck-thorn Berries.

*Yellows,* are Saffron, Yellow-pink, Gambogie.

*Brown,* is Umber burnt.

*Gold Colour* is Orpiment.

Again *Verdigreaſe* with a little Sap-green, makes a good and bright Green.

*Blues,* are Ultramarine, Smalt, Indigo, and blue Bice.

### *Of mixing Colours.*

Colours are mixed by being ground on a Stone with fair Water ſeverally, and dried and kept in Paper Bags for Uſe; except Lampblack, Saffron, Smalt, Gambogie, and Sap-green.

Blu,

*Blue*, to compound; temper a little Indigo and Smalt with Oil.

*A light Blue*, mix Smalt and White-lead together.

*Lead Colour*, mix Lampblack and White-lead together on a Marble.

*A Fox Colour*, is Umber burnt.

*Gold Colour*, is Orpiment mixt with fat Oil, by a Knife on an Earthen Plate, or Gally-tile rather.

To hinder Colours from cracking, put Oil of Walnuts to them.

*Yellow Colour*, beat Saffron to Powder, and ſteep it in Vinegar. Or take the yellow Chives in White Lilies and Gum-water mixt for writing.

*Red*, Vermilion with Gum-Water mixt for writing.

*Golden Letters*, to write; mix Vermilion and Gum Armoniac with Yolks of Eggs.

### *Of dying Wool, Stuffs, &c.*

To dye *Blue*, take Woad one Pound, and mix it with four Pints of Boiling Water, and ſteep Whites in it 24 Hours.

To dye red of a clear Colour, take 60 Pints of Water wherein Bran has been ſteeped 14 Hours, and when ſtrain'd diſſolve two Pounds of Allum, and one Pound of Tartar; in which Water boil what you have to Dye for two Hours, then take it out, and boil it in half as much freſh Water made of Bran; *viz.* 30 Pints; to which add Madder 3 Pounds, and ſo perfect the Colour with moderate Warmth without boiling.

To dye *Green*, Firſt make a Yellow by the Direction underneath; then take 60 Pints of Water wherein Bran hath been ſoaked, aforeſaid; then ſtrain it; let 3 Pounds of Allum be diſſolved in it, and then boil what you have to dye in it, for two Hours.

To dye *Yellow*, take Woad, two Pounds of the ſaid Water of Bran, and boil till the Colour is good.

And if you would have the ſaid *Yellow* to be *Green*, put the Stuff into the aforeſaid *Blue Dye*.

To dye a *Sand Colour*, add Log-wood to the *Black Dye* before mentioned.

To dye Linen or Thread, &c. light Red: Take Powder of Brazil and Vermilion, of each one Ounce, boiled in Allum-water.

To dye Linen or Thread Yellow; diſſolve Gambogia in Allum-water, *&c.*

To ſtain Skins, blue; boil Elder-berries, and with the Liquor bruſh over the Skins, and wring them; then boil the Berries in Allum-water, and wet them twice over.

## *Of Money.*

THE current Coin of this Nation is either made of Copper, Silver, or Gold. Of *Copper* is made the Farthings, Half pence, Pence and Two-pences. Of *Silver* the Pennies, Two-pences, Three-pences, Groats, Sixpences, Shillings, Half-crowns, and Crowns. But there is very little Silver coined below the Six-pence. Of *Gold* is made the Quarter-Guinea, the third of a Guinea, or Seven Shilling Piece, the Half-Guinea, the Guinea and Five Guinea Piece. There are alſo ſome few ancient Pieces of Gold of a pale Colour, as being alloyed with Silver, and therefore may be reckoned the beſt, and ſometimes called Angel or Crown Gold; but the old Gold, or broad Pieces, are moſtly alloyed with Copper, which makes them of a reddiſh Colour.

## *Imaginary Money.*

We appropriate ſeveral Names to Money of which there are no Coin; as

| | *s.* | *d.* |
|---|---|---|
| The Pound of | 20 | 0 |
| The Mark | 13 | 4 |
| The Noble, or half Mark | 6 | 8 |
| The Angel | 10 | 0 |

In *England*, Accounts are kept in Pounds, Shillings, and Pence *Sterling*; and their Marks are derived from their Names in Latin, *viz.* *l.* for *Libræ*, or Pounds, *s.* for *Solidi*, or Shillings, *d.* for *Denarii*, or Pence, *qr.* for *Quadrantes*, or Farthings, four making a Penny; and expreſſed or ſet down thus

| *l.* | *s.* | *d.* | *qr.* |
|---|---|---|---|
| 4 | 16 | 8 | 2 |

but better thus, *l.* 4—16—8 $\frac{1}{2}$: The Mark for Pounds ſtanding before the Sum denominates the firſt Number, and the others are known of Courſe; for after Pounds follow Shillings, and after Shillings ſucceed Pence, *&c.* When

the Price of any thing is Shillings and Pence, it is ſet down thus:
s. d.
4 6
or thus 4/6: and when Shillings and Pence, and Parts of a Penny, expreſſed thus, s. d.
4 6½
or thus 4/6½. The latter Way by ſome is accounted the neater, and the beſt Method to expreſs Parts of a Penny, or Farthings; thus,

¼ a Farthing, or one Fourth Part of what it follows.
½ a Half-penny, or one Half of what it follows.
¾ Three Farthings, or 3-4ths or qrs. of what it follows.

And being thus ſet Fraction-wiſe, the under Figure ſhews how many Parts of the Quantity before it is divided into, and the upper Figure ſhews how many of thoſe under Parts the Fraction ſtands for; as thus, ½ an Ell, ¾ of a Foot, or 9 Inches; and the ſame of a Shilling is 9 Pence; of a Pound is 15s.

Yds.
If you are to ſet down 6 Yards and a half, write thus, 6½
C.
Nineteen Hundred three Quarters thus, 19¾
lb.
Sixteen Pounds and a Quarter thus, 16¼
or elſe thus, 19 C. ¾ 16 lb. ¼, 5 Foot ½, 14 Days ¼. Here the Name is put between the whole Number and the Fraction, which I think is the plainer and better Way: for Example, 6½ Hhds. may, through Ignorance or Wilfulneſs, be read 6 half Hhds. as well as 6 Hhds. and half; and at a certain Place where I have had Buſineſs, the Wharfingers Clerks expreſſed their half Hhds. in this manner.

### *Table of the Value of Gold and Silver.*

| | | l. | s. | d. |
|---|---|---|---|---|
| Gold | 1 Pound is worth | 48 | 0 | 0 |
| | 1 Ounce | 4 | 0 | 0 |
| | 1 Pennyweight | 0 | 4 | 0 |
| | 1 Grain | 0 | 0 | 2 |
| Silver | 1 Pound is worth | 3 | 0 | 0 |
| | 1 Ounce | 0 | 5 | 0 |
| | 1 Pennyweight | 0 | 0 | 3 |
| | 1 Grain | 0 | 0 | ⅛ |

# A TABLE of STAMPS, &c. &c.

*Notes payable on Demand.*

| | £. | s. | | £. | s. | |
|---|---|---|---|---|---|---|
| For | 2 | 0 | and not exceeding | 5 | 5 | *Four Pence* |
| Above | 5 | 5 | ditto . . . . . . . . . | 30 | 0 | *Eight Pence* |
| Above | 30 | 0 | ditto . . . . . . . . . | 50 | 0 | *One Shilling* |
| Above | 50 | 0 | ditto . . . . . . . . . | 100 | 0 | *One and Four Pence* |
| Above | 100 | 0 | ditto . . . . . . . . . | 200 | 0 | *Two Shillings* |
| Above | 200 | 0 | . . . . . . . . . . . . . . . . . | | | *Two and Eight Pence* |

*Bills, or Notes, payable after Date, or Sight.*

| | | | | | | |
|---|---|---|---|---|---|---|
| For . . . . | 2 | 0 | and not exceeding | 30 | 0 | *Eight Pence* |
| Above | 30 | 0 | ditto . . . . . . . . . | 50 | 0 | *One Shilling* |
| Above | 50 | 0 | ditto . . . . . . . . . | 100 | 0 | *One and Four Pence* |
| Above | 100 | 0 | ditto . . . . . . . . . | 200 | 0 | *Two Shillings* |
| Above | 200 | 0 | . . . . . . . . . . . . . . . . . | | | *Two and Eight Pence* |

*Notes payable on Demand and re-iſſuable after Payment.*

| | | | | | | |
|---|---|---|---|---|---|---|
| For . . . . | 2 | 0 | and not exceeding | 5 | 5 | *Eight Pence* |
| Above | 5 | 5 | ditto . . . . . . . . . . | 30 | 0 | *One and Four Pence* |
| Above | 30 | 0 | . . . . . . . . . . . . . . . . | | | *Two and Eight Pence* |

*Foreign Bills of Exchange.*

| | | | | | | |
|---|---|---|---|---|---|---|
| Where the Sum ſhall not exceed | | | | 100 | 0 | *Eight Pence* |
| Above | 100 | 0 | ditto . . . . . . . | 200 | 0 | *One Shilling* |
| Above | 200 | 0 | . . . . . . . . . . . . . . . . . | | | *One and Four Pence* |

RECEIPTS, If in full of all Demands, *Two Shillings*

| | | | | | | |
|---|---|---|---|---|---|---|
| For . . . | 2 | 0 | and under . . . . . | 20 | 0 | *Two Pence* |
| . . . . . | 20 | 0 | ditto . . . . . . . . . | 50 | 0 | *Four Pence* |
| . . . . . | 50 | 0 | ditto . . . . . . . | 100 | 0 | *Six Pence* |
| . . . . | 100 | 0 | ditto . . . . . . . | 500 | 0 | *One Shilling* |
| . . . . | 500 | 0 | or upwards . . . . . . . . . . | | | *Two Shillings* |

*Bonds.*

| | | | | | | |
|---|---|---|---|---|---|---|
| For any ſum not exceeding | | | | 100 | 0 | *Ten Shillings* |
| Above | 100 | 0 | and under . . . . . | 500 | 0 | *Twenty Shillings* |
| . . . . | 500 | 0 | ditto . . . . . . | 1000 | 0 | *Thirty Shillings* |
| . . . . | 1000 | 0 | ditto . . . . . . | 2000 | 0 | *Two Pounds* |
| . . . . | 2000 | 0 | ditto . . . . . . | 5000 | 0 | *Three Pounds* |
| . . . . | 5000 | 0 | and upwards . . . . . . | | | *Five Pounds* |

*Sundries.*

| | | | |
|---|---|---|---|
| Agreements . . . each | 10s. | Debentures . . . . each | 4s. |
| Almanacks . . . . . . | 8d. | Deeds and Indentures | 10s. |
| Awards . . . . . . . . . | 10s. | Inventories . . . . . . | 5s. |
| Bills of Lading . . . . | 2s | Proteſts & Notarial Acts | 4s. |

## A Table for Buying or Selling any Commodity by the Great Hundred, which is 112 Pounds.

| d. | q. | l. | s. | d. | d. | q. | l. | s. | d. | d. | q. | l. | s | d. | d. | q. | l. | s. | d. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 0 | 2 | 4 |  | 1 | 2 | 18 | 4 |  | 1 | 5 | 14 | 4 |  | 1 | 8 | 10 | 4 |
|  | 2 | 0 | 4 | 8 |  | 2 | 3 | 0 | 8 |  | 2 | 5 | 16 | 8 |  | 2 | 8 | 12 | 8 |
|  | 3 | 0 | 7 | 0 |  | 3 | 3 | 3 | 0 |  | 3 | 5 | 19 | 0 |  | 3 | 8 | 15 | 0 |
| 1 | 0 | 0 | 9 | 4 | 7 | 0 | 3 | 5 | 4 | 13 | 0 | 6 | 1 | 4 | 19 | 0 | 8 | 17 | 4 |
|  | 1 | 0 | 11 | 8 |  | 1 | 3 | 7 | 8 |  | 1 | 6 | 3 | 8 |  | 1 | 8 | 19 | 8 |
|  | 2 | 0 | 14 | 0 |  | 2 | 3 | 10 | 0 |  | 2 | 6 | 6 | 0 |  | 2 | 9 | 2 | 0 |
|  | 3 | 0 | 16 | 4 |  | 3 | 3 | 12 | 4 |  | 3 | 6 | 8 | 4 |  | 3 | 9 | 4 | 4 |
| 2 | 0 | 0 | 18 | 8 | 8 | 0 | 3 | 14 | 8 | 14 | 0 | 6 | 10 | 8 | 20 | 0 | 9 | 6 | 8 |
|  | 1 | 1 | 1 | 0 |  | 1 | 3 | 17 | 0 |  | 1 | 6 | 13 | 0 |  | 1 | 9 | 9 | 0 |
|  | 2 | 1 | 3 | 4 |  | 2 | 3 | 19 | 4 |  | 2 | 6 | 15 | 4 |  | 2 | 9 | 11 | 4 |
|  | 3 | 1 | 5 | 8 |  | 3 | 4 | 1 | 8 |  | 3 | 6 | 17 | 8 |  | 3 | 9 | 13 | 8 |
| 3 | 0 | 1 | 8 | 0 | 9 | 0 | 4 | 4 | 0 | 15 | 0 | 7 | 0 | 0 | 21 | 0 | 9 | 16 | 0 |
|  | 1 | 1 | 10 | 4 |  | 1 | 4 | 6 | 4 |  | 1 | 7 | 2 | 4 |  | 1 | 9 | 18 | 4 |
|  | 2 | 1 | 12 | 8 |  | 2 | 4 | 8 | 8 |  | 2 | 7 | 4 | 8 |  | 2 | 10 | 0 | 8 |
|  | 3 | 1 | 15 | 0 |  | 3 | 4 | 11 | 0 |  | 3 | 7 | 7 | 0 |  | 3 | 10 | 3 | 0 |
| 4 | 0 | 1 | 17 | 4 | 10 | 0 | 4 | 13 | 4 | 16 | 0 | 7 | 9 | 4 | 22 | 0 | 10 | 5 | 4 |
|  | 1 | 1 | 19 | 8 |  | 1 | 4 | 15 | 8 |  | 1 | 7 | 11 | 8 |  | 1 | 10 | 7 | 8 |
|  | 2 | 2 | 2 | 0 |  | 2 | 4 | 18 | 0 |  | 2 | 7 | 14 | 0 |  | 2 | 10 | 10 | 0 |
|  | 3 | 2 | 4 | 4 |  | 3 | 5 | 0 | 4 |  | 3 | 7 | 16 | 4 |  | 3 | 10 | 12 | 4 |
| 5 | 0 | 2 | 6 | 8 | 11 | 0 | 5 | 2 | 8 | 17 | 0 | 7 | 18 | 8 | 23 | 0 | 10 | 14 | 8 |
|  | 1 | 2 | 9 | 0 |  | 1 | 5 | 5 | 0 |  | 1 | 8 | 1 | 0 |  | 1 | 10 | 17 | 0 |
|  | 2 | 2 | 11 | 4 |  | 2 | 5 | 7 | 4 |  | 2 | 8 | 3 | 4 |  | 2 | 10 | 19 | 4 |
|  | 3 | 2 | 13 | 8 |  | 3 | 5 | 9 | 8 |  | 3 | 8 | 5 | 8 |  | 3 | 11 | 1 | 8 |
| 6 | 0 | 2 | 16 | 0 | 12 | 0 | 5 | 12 | 0 | 18 | 0 | 8 | 8 | 0 | 24 | 0 | 11 | 4 | 0 |

### *EXAMPLE.*

Firſt, at 5*d.* 3*q.* the Pound, what is the Great Hundred? Look in the Table for 5*d.* 3*q.* in the firſt Column, and againſt it in the Second, you ſhall find 2*l.* 13*s.* 8*d.* and ſo much will 112 Pounds coſt. Again, if a Hundred Weight coſt 4*l.* 8*s.* 8*d.* find 4*l.* 8*s.* 8*d.* and againſt it, in the Column towards the Left Hand, you will find 9*d.* 2*q.* and ſo much it is by the Pound.

*Note,* For every Farthing that one Pound doth coſt, reckon Two Shillings and Four Pence, and that is the Price of the Great Hundred.

Interest

### INTEREST at *Three per Cent.*

| Principal. | *for One Day.* l. | s. | d. | f. | *Thirty Days.* l. | s. | d. | f. | *A Year.* l. | s. | d. | f. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| £1 | | | | | | | | 2 | | | 7 | |
| 2 | | | | | | | 1 | | | 1 | 2 | 1 |
| 3 | | | | | | | 1 | 3 | | 1 | 9 | 2 |
| 4 | | | | | | | 2 | 1 | | 2 | 4 | 3 |
| 5 | | | | | | | 2 | 3 | | 3 | | |
| 6 | | | | | | | 3 | 2 | | 3 | 7 | |
| 7 | | | | | | | 4 | | | 4 | 2 | 1 |
| 8 | | | | | | | 4 | 2 | | 4 | 9 | 2 |
| 9 | | | | | | | 5 | 1 | | 5 | 4 | 3 |
| 10 | | | | | | | 5 | 3 | | 6 | | |
| 20 | | | | 1 | | | 11 | 3 | | 12 | | |
| 30 | | | | 2 | | 1 | 5 | 3 | | 18 | | |
| 40 | | | | 3 | | 1 | 11 | 2 | 1 | 4 | | |
| 50 | | | | 3 | | 2 | 5 | 2 | 1 | 10 | | |
| 60 | | | 1 | | | 2 | 11 | 2 | 1 | 16 | | |
| 70 | | | 1 | 1 | | 3 | 5 | 1 | 2 | 2 | | |
| 80 | | | 1 | 2 | | 3 | 11 | 1 | 2 | 8 | | |
| 90 | | | 1 | 3 | | 4 | 5 | 1 | 2 | 14 | | |
| 100 | | | 1 | 3 | | 4 | 11 | | 3 | | | |
| 200 | | | 3 | 3 | | 9 | 10 | 1 | 6 | | | |
| 300 | | | 5 | 3 | | 14 | 9 | 2 | 9 | | | |
| 400 | | | 7 | 3 | | 19 | 8 | 2 | 12 | | | |
| 500 | | | 9 | 3 | 1 | 4 | 7 | 3 | 15 | | | |
| 600 | | | 11 | 3 | 1 | 9 | 7 | | 18 | | | |
| 700 | | 1 | 1 | 3 | 1 | 14 | 6 | | 21 | | | |
| 800 | | 1 | 3 | 3 | 1 | 19 | 5 | 1 | 24 | | | |
| 900 | | 1 | 5 | 3 | 2 | 4 | 4 | 2 | 27 | | | |
| 1000 | | 1 | 7 | 2 | 2 | 9 | 3 | 3 | 30 | | | |
| 2000 | | 3 | 3 | 1 | 4 | 18 | 7 | 2 | 60 | | | |
| 3000 | | 4 | 11 | | 7 | 7 | 11 | 1 | 90 | | | |
| 4000 | | 6 | 6 | 3 | 9 | 17 | 3 | | 120 | | | |
| 5000 | | 8 | 2 | 2 | 12 | 6 | 7 | | 150 | | | |
| 6000 | | 9 | 10 | | 14 | 15 | 10 | 3 | 180 | | | |
| 7000 | | 11 | 5 | 3 | 17 | 5 | 2 | 2 | 210 | | | |
| 8000 | | 13 | 1 | 2 | 19 | 14 | 6 | 1 | 240 | | | |
| 9000 | | 14 | 9 | 2 | 22 | 3 | 10 | | 270 | | | |
| 10000 | | 16 | 5 | 1 | 24 | 13 | 1 | 3 | 300 | | | |

## INTEREST at *Four per Cent.*

| Principal. | *for One Day.* | | | | *Thirty Days.* | | | | *A Year.* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *l.* | *s.* | *d.* | *f.* | *l.* | *s.* | *d.* | *f.* | *l.* | *s.* | *d.* | *f.* |
| £1 | | | | | | | | 3 | | | 9 | 2 |
| 2 | | | | | | | 1 | 2 | | 1 | 7 | |
| 3 | | | | | | | 2 | 1 | | 2 | 4 | 3 |
| 4 | | | | | | | 3 | | | 3 | 2 | 1 |
| 5 | | | | | | | 3 | 3 | | 4 | | |
| 6 | | | | | | | 4 | 2 | | 4 | 9 | 2 |
| 7 | | | | | | | 5 | 2 | | 5 | 7 | |
| 8 | | | | | | | 6 | 1 | | 6 | 4 | 3 |
| 9 | | | | | | | 7 | | | 7 | 2 | 1 |
| 10 | | | | 1 | | | 7 | 3 | | 8 | | |
| 20 | | | | 2 | | 1 | 3 | 3 | | 16 | | |
| 30 | | | | 3 | | 1 | 11 | 2 | 1 | 4 | | |
| 40 | | | 1 | | | 2 | 7 | 2 | 1 | 12 | | |
| 50 | | | 1 | 1 | | 3 | 3 | 1 | 2 | | | |
| 60 | | | 1 | 2 | | 3 | 11 | 1 | 2 | 8 | | |
| 70 | | | 1 | 3 | | 4 | 7 | | 2 | 16 | | |
| 80 | | | 2 | | | 5 | 3 | | 3 | 4 | | |
| 90 | | | 2 | 1 | | 5 | 11 | | 3 | 12 | | |
| 100 | | | 2 | 2 | | 6 | 6 | 3 | 4 | | | |
| 200 | | | 5 | 1 | | 13 | 1 | 3 | 8 | | | |
| 300 | | | 7 | 3 | | 19 | 8 | 2 | 12 | | | |
| 400 | | | 10 | 2 | 1 | 6 | 3 | 2 | 16 | | | |
| 500 | | 1 | 1 | | 1 | 12 | 10 | 2 | 20 | | | |
| 600 | | 1 | 3 | 3 | 1 | 19 | 5 | 1 | 24 | | | |
| 700 | | 1 | 6 | 1 | 2 | 6 | 0 | 1 | 28 | | | |
| 800 | | 1 | 9 | | 2 | 12 | 7 | | 32 | | | |
| 900 | | 1 | 11 | 2 | 2 | 19 | 2 | | 36 | | | |
| 1000 | | 2 | 2 | 1 | 3 | 5 | 9 | | 40 | | | |
| 2000 | | 4 | 4 | 2 | 6 | 11 | 6 | | 80 | | | |
| 3000 | | 6 | 6 | 3 | 9 | 17 | 3 | | 120 | | | |
| 4000 | | 8 | 9 | | 13 | 3 | | | 160 | | | |
| 5000 | | 10 | 11 | 2 | 16 | 8 | 9 | | 200 | | | |
| 6000 | | 13 | 1 | 3 | 19 | 14 | 6 | | 240 | | | |
| 7000 | | 15 | 4 | | 23 | 0 | 3 | | 280 | | | |
| 8000 | | 17 | 6 | 1 | 26 | 6 | 0 | | 320 | | | |
| 9000 | | 19 | 8 | 2 | 29 | 11 | 9 | | 360 | | | |
| 10000 | 1 | 1 | 11 | | 32 | 17 | 6 | 1 | 400 | | | |

### INTEREST at *Five per Cent.*

| Principal. | *for one Day.* | | | | *Thirty Days.* | | | | *A Year.* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *l.* | *s.* | *d.* | *f.* | *l.* | *s* | *d.* | *f.* | *l.* | *s.* | *d.* | *f.* |
| £1 | | | | | | | | 3 | | 1 | | |
| 2 | | | | | | | 1 | 3 | | 2 | | |
| 3 | | | | | | | 2 | 3 | | 3 | | |
| 4 | | | | | | | 3 | 3 | | 4 | | |
| 5 | | | | | | | 4 | 3 | | 5 | | |
| 6 | | | | | | | 5 | 3 | | 6 | | |
| 7 | | | | | | | 6 | 3 | | 7 | | |
| 8 | | | | 1 | | | 7 | 3 | | 8 | | |
| 9 | | | | 1 | | | 8 | 3 | | 9 | | |
| 10 | | | | 1 | | | 9 | 3 | | 10 | | |
| 20 | | | | 2 | | 1 | 7 | 2 | 1 | | | |
| 30 | | | | 3 | | 2 | 5 | 2 | 1 | 10 | | |
| 40 | | | 1 | 1 | | 3 | 3 | 1 | 2 | | | |
| 50 | | | 1 | 2 | | 4 | 1 | 1 | 2 | 10 | | |
| 60 | | | 1 | 3 | | 4 | 11 | | 3 | | | |
| 70 | | | 2 | 1 | | 5 | 9 | | 3 | 10 | | |
| 80 | | | 2 | 2 | | 6 | 6 | 3 | 4 | | | |
| 90 | | | 2 | 3 | | 7 | 4 | 3 | 4 | 10 | | |
| 100 | | | 3 | 1 | | 8 | 2 | 2 | 5 | | | |
| 200 | | | 6 | 2 | | 16 | 5 | 1 | 10 | | | |
| 300 | | | 9 | 3 | 1 | 4 | 7 | 3 | 15 | | | |
| 400 | | 1 | 1 | | 1 | 12 | 10 | 2 | 20 | | | |
| 500 | | 1 | 4 | 1 | 2 | 1 | 1 | | 25 | | | |
| 600 | | 1 | 7 | 2 | 2 | 9 | 3 | 3 | 30 | | | |
| 700 | | 1 | 11 | | 2 | 17 | 6 | 1 | 35 | | | |
| 800 | | 2 | 2 | 1 | 3 | 5 | 9 | | 40 | | | |
| 900 | | 2 | 5 | 2 | 3 | 13 | 11 | 2 | 45 | | | |
| 1000 | | 2 | 8 | 3 | 4 | 2 | 2 | 1 | 50 | | | |
| 2000 | | 5 | 5 | 3 | 8 | 4 | 4 | 2 | 100 | | | |
| 3000 | | 8 | 2 | 2 | 12 | 6 | 6 | 3 | 150 | | | |
| 4000 | | 10 | 11 | 2 | 16 | 8 | 9 | | 200 | | | |
| 5000 | | 13 | 8 | 1 | 20 | 10 | 11 | 2 | 250 | | | |
| 6000 | | 16 | 5 | | 24 | 13 | 1 | 3 | 300 | | | |
| 7000 | | 19 | 2 | | 28 | 15 | 4 | | 350 | | | |
| 8000 | 1 | 1 | 10 | 3 | 32 | 17 | 6 | 1 | 400 | | | |
| 9000 | 1 | 4 | 7 | 3 | 36 | 19 | 8 | 2 | 450 | | | |
| 10000 | 1 | 7 | 4 | 3 | 41 | 1 | 11 | | 500 | | | |

### *A Hint of Generals, or Things proper to be known and remembered on particular Occaſions.*

A Ream of Paper, 20 Quires.
A Quire of Paper, 24 Sheets.
A Bale of Paper, 10 Reams.
A Roll of Parchment, 5 Dozen, or 60 Skins.
A Dicker of Hides, 10 Skins.
Ditto of Gloves, 10 Dozen Pair.
A Laſt of Hides, 20 Dickers.
A Load of Timber unhewed, 40 Feet.
A Chaldron of Coals, 36 Buſhels.
A Hogſhead of Wine, 63 Gallons.
Ditto of Beer, 54 Gallons.
A Barrel of Beer, 36 Gallons.
Ditto of Ale, 32 Gallons.
A Groſs, 144, or 12 Dozen.
A Weigh of Cheeſe, 256 Pounds.
Days in the Year, 365; Weeks, 52, and Hours 8766.
Pence in the Pound, 240; Farthings, 960.
An Acre of Land, 160 ſquare Poles or Perches.
A Laſt of Corn or Rape-ſeed, 10 Quarters.
Ditto of Pot Aſhes, Codfiſh, White-herrings, Meal, Pitch, and Tar, 12 Barrels.
Ditto of Flax and Feathers, 17 C. of Gunpowder 24 Barrels or 2400lb. of Wool, 4368lb.
A Ton of Wine. 252 Gallons: Oil of Greenland, 252 Gallons; and Sweet Oil of Genoa, 236 Gallons.
A Ton in Weight, 20 C. of Iron, &c. but of Lead there is but 19 C. and a Half called a Fodder or Fother.
A Todd of Wool, 28 Pounds.
A Pack of Ditto, 364 Pounds.
A Load of Bricks 500; and of plain Tiles 1000.
A Stone of Fiſh 8lb. and of Wool 14lb. The ſame for Horſeman's Weight, and alſo Hay; but Pepper, Cinnamon, and Allum, have but 13lb. ½ to the Stone.
Ditto of Glaſs, 5 Pounds; and a Seam of ditto, 24 Stone.
A Truſs of Hay, 56 Pounds, and a Load of ditto, 39 Truſſes.

Note, *New* Hay *in* June *and* Auguſt, ought to be 60 *Pounds to the Truſs; as* per *Statute of* 2 William *and* Mary, 1693.

A Cade of Red-Herrings, 500; and of Sprats, 1000, Iron and Shot 14lb. to the Stone.

### *Barrels of Sundry Commodities.*

Anchovies, 30 lb.
A double Barrel, 60 lb.
Nuts or Apples, 3 Buſhels.
Pot-aſh or Barilla, 200 lb.
White or Black Plates, 300.
Candles, 10 doz. lb.
Salmon or Eels, 42 Gall.
Figs 3 qrs. 14 lb. to 2 C¼
Raiſins, 1 Cwt.
Oil 31 Gallons and half.
Spaniſh Tobacco, 2 C to 3 C.
Gunpowder, 1 Cwt.
Soap, 240 lb.
Butter, 224 lb.
Herrings, 32 Gallons.

### *Things in Wholeſade Trade, bought and ſold by the Thouſand.*

Cuttle Bones
Oranges and Lemons
Chair Nails
Tacks and Tentor Hooks
Pomegranates and Tazels
Gooſe Quills and Thimbles.
Bricks
Clinkers or Flanders Tiles
Billets and Leaves of Horn.
Barrel Hoops
Squirrel Skins
Slate and Hilling Stones

Pins and ſmall Needles by the 1000 Dozen.

### *Things ſold and bought at Six Score to the Hundred.*

Banks and Barlings
Barrel and Pipe Boards
Bompſpars and Bow-ſtaves
Canſpars and Caprevans
Herrings and Deal Boards
Nails Eggs and Cod-fiſh
Cole, Ling, and New-foundland-fiſh, Stock-fiſh of all Sorts
Ells of Canvas, and moſt Foreign Linens
and Hogſhead Staves

### *Of Bonds, Bills, Indentures, Letters of Attorney, Wills and other uſeful Writings.*

Precedents of theſe are very neceſſary, not only for the underſtanding of them, but to know how to make them properly on Occaſion.

### *A Bond from One to One.*

KNOW all Men by theſe preſents, that I Abraham Darmel, of the Pariſh of *St. Sepulchre*'s, in the City of *London*, Gentleman, am held and firmly bound to *John*

*Melvil*, of the ſaid City of *London*, Eſq. in the Sum of Fifty Pounds of good and lawful Money of *Great Britain*, to be paid to the ſaid *John Melvil*, or his certain Attorney, his Executors, Adminiſtrators or Aſſigns; for the true Payment whereof, I bind myſelf, my Heirs, Executors and adminiſtrators, firmly by theſe Preſents ſealed in the thirty-eighth Year of the Reign of our Sovereign Lord *George* the Third, by the Grace of God, of *Great Britain France* and *Ireland*, King, Defender of the Faith, and ſo forth, and in the Year of our Lord, One Thouſand Seven Hundred and Ninety-eight.

The Condition of this Obligation is ſuch, That if the above bounden *Abraham Darmel*, his Heirs, Executors or Adminiſtrators, do well and truly pay, or cauſe to be paid to the above-named *John Melvil*, his Executors, Adminiſtrators, or Aſſigns, the full Sum of twenty-five Pounds of good and lawful Money of *Great Britain*, on the twentieth Day of *Auguſt* next enſuing the Date hereof, with the lawful Intereſt thereof: then this Obligation to be void, or elſe to remain, continue, and be in full Force and Virtue.

*Sealed and Delivered*
*(being firſt duly*
*ſtamped) in the*
*Preſence of* *Abraham Darmel.* ⊙
George Needy,
Thomas Truſty.

Note, *The Mark* ⊙ *in this and the Form ſubſequent, repreſents the Seal, which in this and all thoſe in which it appears, ought to be affixed: the Perſon who executes any of them (a Will excepted, concerning which Directions will be given in its Place) is in the Preſence of the Witneſſes to take off the Seal (that is the Inſtrument with which the Impreſſion was made) and then taking the Paper or Parchment, in his or her Right-hand, is to pronounce theſe Words,* I deliver this as my Act and Deed for the Purpoſes within mentioned.

### *A Bill with a Penalty.*

KNOW all Men by theſe Preſents, that I *John Jenkins*, of the City of *Chicheſter*, in the County of *Suſſex*, Victualler, do acknowledge myſelf indebted to *Martin Moneyman*, of *Eaſt Grimſtead*, in the County aforeſaid, Grazier, in the Sum of twenty Pounds of good and lawful Money of *Great Britain*, to be paid unto the ſaid *Martin Moneyman*, his Heirs, Executors, Adminiſtrators or Aſſigns, in or upon the 20th Day of *September* next enſuing the Date hereof, without Fraud or further Delay: for and in Conſideration of which Payment well and truly to be made and done, I bind myſelf, my Heirs, Executors, and Adminiſtrators, in the Penal Sum of Forty Pounds, of the like lawful Money, firmly by theſe Preſents: In witneſs whereof I have hereunto ſet my Hand and Seal this twenty-fifth Day of *March*, in the thirty-eighth Year of the Reign of our Sovereign King *George* the Third, and in the Year of our Lord God, 1798.

*Signed, Sealed, and Delivered in the Preſence of* *John Jenkins.* ⊙
Titus Teſtimony,
Andrew Affidavit.

### *A ſhort Bill or Note of one's Hand.*

KNOW all Men by theſe Preſents, that I *Peter Pennyleſs*, of the Pariſh of *St. Saviour's*, *Southwark*, in the County of *Surry*, Blackſmith, do owe, and own myſelf to ſtand indebted to *Robert Rich*, of the Pariſh of *St. Andrew*, *Holborn*, in the County of *Middleſex*, Gent. in the juſt and due Sum of Five Pounds of lawful Money of *Great Britain*, which by theſe Preſents I promiſe to pay unto him the ſaid *Robert Rich*, at or upon the ſixth Day of *October* next enſuing the Date hereof: For the true Performance of which Payment, well and truly to be made, and in witneſs hereof I have ſet my Hand to theſe Preſents, the 5th Day of *Jan.* 1798.

*Peter Pennyleſs.*

Among Men of Buſineſs the following Form is commonly uſed, and is equally effectual in Law.

I Promiſe to pay to Mr. *Robert Rich*, or his Order, the Sum of Five Pounds, five Months after Date, for Value received, this fifth Day of *May*, 1798, by

*Peter Pennyleſs.*

This Note is transferable to another, if *Robert Rich* writes his Name on the back thereof; but then if *Peter Pennyleſs* doth not pay it, *Robert Rich* is liable thereto.

### *A Penal Bill from Two to One.*

KNOW all Men by theſe Preſents, That we *Laurence Luckleſs* and *Peter Pauper*, both of the Pariſh of *Saint Dunſtan, Stepney*, in the county of *Middleſex*, Weavers, do acknowledge and own ourſelves to ſtand indebted to *Gabriel Greedy*, of the Pariſh of *Saint Olave, Southwark*, in the County of *Surry*, Feltmaker, in the juſt and due Sum of ten Pounds, of good and lawful Money of *Great Britain*, to be paid unto him, the ſaid *Gabriel Greedy*, his Heirs, Executors, Adminiſtrators, or Aſſigns, at or upon the thirteenth Day of *October* next enſuing the Date hereof, without Fraud or further Delay; for, and in Conſideration of which Payment, well and truly to be made, we do bind our Heirs, Executors, and Adminiſtrators, in the penal Sum of twenty Pounds of the like lawful Money, firmly by theſe Preſents. In witneſs whereof, we have hereunto ſet our Hands and Seals, this ſixteenth Day of *May*, in the Thirty-eighth Year of the Reign of our Sovereign Lord King *George* the Third, &c. and in the Year of our Lord One Thouſand Seven Hundred and Ninety-eight.

*Signed, ſealed and delivered in the Preſence of*
Wimbledon Witneſs,
Timothy Teſtis.

*Laur. Luckleſs.* ⊙
*Peter Pauper.* ⊙

Note, *That Bills without Penalty are of no more Force or laſting than Book Debts, as they are not ſealed; yet they are eſteemed better Security, becauſe the Party's Hand, if he contends, may be proved againſt him; but oftentimes, on the Adjuſtment of Accounts, it is uſual to have the Party's Hand in the Book, which is as valid as the other; but in my Opinion, there ought to be a Witneſs to either of them.*

Note alſo, *All Obligations muſt be in* Engliſh, *and the Words at length; they may be ſuited to any Condition by only altering the*

*the Name or Names, Place or Places of Abode, Time or Times, Sum or Sums of Money*, Date, &c.

Every Bond, Letter of Attorney, Indenture, and other Thing to which a Seal is affixed, Wills excepted, muſt, to render it effectual, be ſtamped with three Sixpenny Stamps.

Note, *By a late Act of Parliament, a Shilling Stamp more is become neceſſary.*

Thus you may proceed of yourſelf, and ſave the charge of going too far diſtant to a Scrivener or an Attorney, here being no other Charge neceſſary but the ſtamped Paper, and your own Trouble of writing.

### *A Letter of Attorney.*

KNOW all Men by theſe preſents, That I *Charles Carefull* of *Lewes*, in the County of *Suſſex*, Apothecary (for divers Conſiderations and good Cauſes me hereunto moving) have made, ordained, conſtituted, and appointed, and by theſe Preſents do make, ordain, conſtitute, and appoint, my truſty Friend *William Wagſtaff*, of *Pemſey*, in the County aforeſaid, Gentleman, my true and lawful Attorney, for me, in my Name, and to my Uſe, to aſk, demand, recover, or receive of or from *A. B.* of *Rye* in the ſaid County, the Sum of Forty Pounds; giving, and by theſe Preſents granting to my ſaid Attorney, ſole and full Power and authority, to take, purſue, and follow ſuch legal Courſes, for the Recovery, Receiving, and Obtaining the ſame, as I myſelf might or could do, were I perſonally preſent; and upon the Receipt of the ſame Acquittances, and other ſufficient Diſcharges, for me, and in my Name to make, ſign, ſeal, and deliver; as alſo, one or more Attorney or Attorneys under him to ſubſtitute or appoint, and again at his Pleaſure to revoke; and further to do, perform, and execute for me, and in my Name, all and ſingular Thing or Things, which are or may be neceſſary touching and concerning the premiſes, as fully, thoroughly and entirely, as I the ſaid *Charles Carefull* in my own Perſon, ought, or could do, in and about the ſame: Ratifying allowing, and confirming whatſoever my ſaid Attorney ſhall lawfully do, or cauſe to be done, in and about the Execution of the Premiſes, by virtue of theſe Preſents. In witneſs whereof I have hereunto ſet my Hand and Seal, the ſixth Day of May, in the Thirty-eighth Year of the Reign of our Sovereign Lord *George* the Third, by the Grace of

God, King of *Great Britain*, &c. and in the Year of our Lord One Thouſand Seven Hundred and Ninety-Eight.

### *A Letter of Attorney by a Seaman.*

KNOW all Men by theſe Preſents, that I *Timothy Tarpaulin*, Mariner, now belonging to his Majeſty's Ship the *Rye*, for divers good Cauſes and Conſiderations me thereunto moving, have and by theſe Preſents do make my truſty Friend *Henry Hearty*, Citizen and Baker of *London*, (or my beloved Wife *Penelope Tarpaulin)* my true and lawful Attorney, for me, and in my Name, and for my Uſe, to aſk, demand, and receive, of and from the Right Honourable the Treaſurer, or Paymaſter of his Majeſty's Navy and the Commiſſioners of Prize-money, and whom elſe it may concern, as well as all ſuch Wages and Pay, Bounty-money, Prize-money, and all other Sum or Sums of Money whatſoever, as now are, and which hereafter ſhall and may be due, or payable unto me; alſo all ſuch Penſions, Salaries, Smart-money, or all other Money and things whatſoever, which now are, or at any Time hereafter ſhall or may be due to me, for my Service, or otherwiſe, in any one of his Majeſty's Ship or Ships, Frigates or Veſſels: Giving and hereby granting, unto the ſaid Attorney, full and whole Power, to take, purſue, and follow ſuch legal Ways and Courſes, for the Recovery, Receiving and Obtaining, and Diſcharging upon the ſaid Sum or Sums of Money, or any of them, as I myſelf might or could do, were I perſonally preſent; and I do hereby ratify, allow, and confirm, all and whatever my Attorney ſhall lawfully do or cauſe to be done, in and about the Execution of the Premiſes, by virtue of theſe Preſents. In witneſs whereof I have hereunto ſet my Hand and Seal, this twenty-ſecond Day of *March*, One Thouſand Seven Hundred and Ninety-five, *&c.*

*Timothy Tarpaulin.* ⊙

### *A ſhort Will in legal Form.*

IN the Name of God, *Amen*. *I William Weakly* of the City of *London*, Haberdaſher, being very ſick and weak in (or in perfect Health of) Body, but (or and) of perfect Mind and Memory, Thanks be given unto God; calling unto Mind the Mortality of my Body, and knowing that it is appointed for all Men once to die, do make and ordain this my laſt Will and Teſtament: That is to ſay, principally, and firſt of all, I give and recommend my Soul into the Hand of Almighty God that gave it, and my Body I recommend to the Earth; to be buried in decent Chriſtian Burial, at the Diſcretion of my Executors; nothing doubting but at the general Reſurrection, I ſhall receive the ſame again, by the mighty Power of God. And as touching ſuch worldly Eſtate wherewith it hath pleaſed God to bleſs me in this Life, I give, deviſe, and diſpoſe of the ſame in the following Manner and Form.

*Firſt*, I give and bequeath to *Elizabeth*, my dearly beloved Wife, the Sum of five Hundred Pounds, of lawful Money of *England*, to be raiſed and levied out of my Eſtate, together with all my houſhold Goods, Debts, and moveable Effects.

*Alſo*, I give to my well-beloved Daughter *Elizabeth Weakly*, whom I likewiſe conſtitute, make, and ordain the ſole Executrix of this my laſt Will and Teſtament, all and ſingular my Lands, Meſſuages, and Tenements, by her freely to be poſſeſſed and enjoyed. And I do hereby utterly diſallow, revoke, and diſannual all and every other former Teſtaments, Wills, Legacies, Bequeſts, and Executors by me in any Ways before named, willed and bequeathed, ratifying and confirming this, and no other, to be my laſt Will and Teſtament. In witneſs whereof I have hereunto ſet my Hand and Seal, this 12th Day of *April*, in the Year of our Lord One Thouſand Seven Hundred and Ninety-eight.

*Signed, ſealed, publiſhed, pronounced and declared by the ſaid* William Weakly, *as his laſt Will and Teſtament, in the Preſence of us, who, in his Preſence, and in the Preſence of each other, have hereunto ſubſcribed our Names.*

*Will Weakly.* ⊙

Henry Hardy.
Samuel Short.
William Wortle.

The Teſtator, after taking off the Seal, muſt, in the Preſence of the Witneſſes, pronounce theſe Words, *I publiſh and declare this to be my laſt Will and Teſtament.*

*Note*, If a Will be already made, and the Perſon hath no Mind to alter it, but to add ſomething more, there may be affixed the following Codicil or Schedule to it, and it will ſtand good in Law, as Part of the Will.

### *A Codicil to a Will.*

Be it known unto all Men by theſe Preſents, That I *William Weakly*, of the City of *London*, Haberdaſher, have made and declared my laſt Will and Teſtament in Writing, bearing Date the 12th Day of *April*, One Thouſand Seven Hundred and Ninety-eight. I the ſaid *William Weakly*, by this preſent *Codicil*, do ratify and confirm my ſaid laſt Will and Teſtament; and do further give and bequeath unto my loving Couſin and Godſon *William Weakly*, junior, the Sum of fifty Pounds of good and lawful Money of *England*, to be paid unto him the ſaid *William Weakly*, by my Executrix, out of my Eſtate; And my Will and Meaning is, that this *Codicil* be adjudged to be a Part and Parcel of my laſt Will and Teſtament; and that all Things therein mentioned and contained be faithfully and truly performed, and as fully and amply in every reſpect, as if the ſame were ſo declared and ſet down in my ſaid laſt Will and Teſtament. Witneſs my Hand this 20th Day of *April*, One Thouſand Seven Hundred and Ninety-eight.

*Signed in the Preſence of us,* *William Weakly.* ⊙
A. B.
C. D.

### *A Deed of Gift.*

TO all People to whom theſe Preſents ſhall come, I *George Generous*, do ſend greeting. Know ye, that I the ſaid *George Generous*, of the Pariſh of *Pancras*, in the County of *Middleſex*, Brick-maker, for and in Conſideration of the Love, Good-will, and Affection, which I have and do bear towards my loving Siſter, *Sarah Sorrowful*, of the ſame Pariſh, and County, Widow, have given and granted, and by theſe Preſents do freely give and grant unto the ſaid *Sarah Sorrowful*, her Heirs, Executors, or Adminiſtrators, all and ſingular my Goods and Chattels, now being in my preſent Dwelling-houſe in the Pariſh aforeſaid, known by the Name of *Fiſhers Figgary*, of which (before the Signing of theſe Preſents) I have delivered her, the ſaid

*Sarah Sorrowful*, an Inventory ſigned with my own Hand, and bearing even Date, to have and to hold all the ſaid Goods and Chattels in the ſaid Premiſes or Dwelling-houſe to her the ſaid *Sarah Sorrowful*, her Heirs, Executors, or Adminiſtrators, from henceforth, as her and their proper Goods and Chattels abſolutely without any Manner of Condition. In witneſs whereof, I have hereunto ſet my Hand and Seal, this 10th Day of *April*, One Thouſand Seven Hundred and Ninety-eight.

*Signed, ſealed, and delivered in the Preſence of* *George Generous.* ⊙
Daniel Drayton.
Aaron Atkins.

*Note*, This Precedent may be extended to the giving away of Cattle, Corn, Houſe or Land, if not entailed, *&c.* but the Particulars muſt be named, *&c.*

### *An Indenture of Apprenticeſhip.*

THIS Indenture witneſſeth, that *Richard Reynolds*, Son of *Robert Reynolds*, late of *Pomſey*, in the County of *Suſſex*, hath put himſelf, and by theſe Preſents doth voluntarily put himſelf Apprentice to *Charles Carpenter*, Citizen and Linen-draper of *London*, to learn his Art, Trade, or Myſtery, and after the Manner of an Apprentice to ſerve him from the Day of the Date hereof, for and during the full Term of Seven Years next enſuing: During all which Time, he the ſaid Apprentice his ſaid Maſter ſhall faithfully ſerve, his Secrets keep, his lawful Commands every where gladly obey. He ſhall do no Damage to his ſaid Maſter, nor ſee it to be done by others, without letting or giving Notice thereof to his ſaid Maſter. He ſhall not waſte his ſaid Maſter's Goods, nor lend them unlawfully to others. He ſhall not commit Fornication, nor contract Matrimony within the ſaid Term. At Cards, Dice, or any unlawful Game, he ſhall not play, whereby his ſaid Maſter may be damaged. With his own Goods, or the Goods of others during the ſaid Term, without Licence of his ſaid Maſter, he ſhall neither buy nor ſell. He ſhall not abſent himſelf Day nor Night from his ſaid Maſter's Service without his Leave. Nor haunt Alehouſes, Taverns or Playhouſes: But in all Things behave himſelf as a faithful Apprentice ought to do, during the ſaid Term. And the ſaid Maſter ſhall uſe the utmoſt of his Endeavous to teach, or cauſe to be taught and inſtructed the ſaid Apprentice in the Trade and Myſtery he now profeſſeth, occupieth, or followeth: and procure or provide for him the ſaid Apprentice, ſufficient Meat, Drink, Apparel, Waſhing and Lodging, fitting for an Apprentice, during the ſaid Term: And for the true Performance of all and every the ſaid Covenants and Agreements either of the ſaid Parties bind themſelves unto the other by theſe Preſents.

In witneſs whereof they have interchangeably put their Hands and Seals this 16th Day of *April*, in the 38th Year of the Reign of our Sovereign Lord George III. by the Grace of God, King of *Great Britain*, &c. and in the Year of our Lord God, One Thouſand Seven Hundred and Ninety-eight.

*Note*, If an Apprentice be enrolled before a Juſtice of the Peace or other proper Officer, (the Chamberlain being ſuch in *London*) he cannot ſue out his Indenture, but upon Proof of unmerciful Uſage, Want of Victuals, or other Neceſſaries, or his Maſter's being incapable of teaching him his Trade, or not chuſing it ſo to be done at his proper Charge by others. And the ſame holds good in relation to a Miſtreſs. But there being no Inrollment, an Indenture may be ſued out without ſhewing Cauſe, in Cities and Corporations, *&c.*

## *A General Releaſe.*

KNOW all Men by theſe Preſents, That I *Peter Peaceable*, of *Haſtings*, in the County of *Suſſex*, Tobacconiſt, have remiſed, releaſed, and for ever quit Claim to *William Winter*, of *Rye*, in the County aforeſaid, Fiſh-Chapman, his Heirs, Executors and Adminiſtrators, of all and all Manner of Action or Actions, Suits, Bills, Bonds, Writings, Debts, Dues, Duties, Accompts, Sum and Sums of Money, Leaſes, Mortgages, Judgments by Confeſſion or otherwiſe obtained, Executions, Extents, Quarrels, Controverſies, Treſpaſſes, Damages and Demands whatſoever, which by Law or Equity, or otherwiſe ſoever, I the ſaid *Peter Peaceable*, againſt the ſaid *William Winter* ever had, and which I, my Heirs, Executors, or Adminiſtrators, ſhall or may claim, challenge, or demand, for or by Reaſon, or Means, Colour of any Matter, Cauſe, or Thing whatſoever, to the Day of the Date of theſe Preſents. In Witneſs whereof I have hereunto ſet my Hand and Seal, this 15th Day of *April*, &c.

*Peter Peaceable.* ⊖

*The*

# *The Complete* GARDENER: *Or, The Practice of Gardening in all its Branches, for the twelve Months in the Year.*

## JANUARY.

### *Pleaſure Garden.*

FROST is to be expected now, and nothing is ſo dangerous to tender Flower-roots, and their Shoots for Spring.

Ranunculuſes, Anemonies and Tulips will be in Danger; cover the Beds to guard them, lay on Peaſe-ſtraw, where they are not come up; but where the Shoot appears, place Hoops with Mats and Cloths upon them. This is the common Practice; but in that excellent Work, *The Complete Body of Gardening*, lately publiſhed, there is a new Method propoſed, and much eaſier and better. This is to place behind them a Reed-hedge, ſloping three Feet forward. A Mat is to be let down from the Top in ſevere Weather, and taken up in mild. This certainly preſerves them, and yet does not draw them weak, or make them tender.

Cover the Beds and Boxes of Seedling Flowers; and take off the Defence when the Weather is milder.

Clean the Auricula Plants, pick off dead Leaves, and ſcrape away the Surface of the Mould; put freſh Mould in the place of it, and ſet the Pots up to the Brim in the Mould of a dry Bed, and place behind them a Reed-hedge.

Cover Carnation Plants from Wet, and defend them from Mice and Sparrows.

### *Kitchen Garden.*

Throw up ſome new Dung in a Heap to heat, that it may be ready to make Hot-beds both for the early Cucumbers and Melons in this Part of the Ground, and for raiſing Seeds of Annuals in the Flower-garden.

Dig up the Ground that is to be ſown with the Spring-crops, that it may lay and mellow.

Nurſe the Cauliflower Plants kept under Glaſſes carefully; ſhut out the Froſt, but in the Middle of milder Days let in a little Air; pick up the dead Leaves, and gather up the Mould about the Stalks.

Make a ſlight Hot-bed in the open Ground, for young Sallading, and place Hoops over it, that it may be covered in very hard Weather.

Plant out Endive for Seed into warm Borders; earth and blanch Cellery.

Sow a few Beans and Peas, and ſeek and deſtroy Snails and other Vermin.

### *Orchard and Fruit Garden.*

Fruit-trees, whether in Orchards, or Eſpaliers, or againſt Walls, demand the ſame general Management.

Cut out dead Wood and irregular Branches, clean the Stumps and Boughs from Moſs with a hollow Iron; and repair Eſpaliers, faſtening the Stakes and Poles with Nails and Wire, and tying the Shoots down with Twigs of Oſier.

Place Stakes by all new-planted Trees; and cut Grafts to be ready, lay them in the Earth under a warm Wall.

## FEBRUARY.

### *Pleaſure Garden.*

Make Hot-beds for annual Flowers with the Dung laid up for that Purpoſe, and ſow them upon a good Thickneſs of Mould, laid regularly over the Dung.

Tranſplant perennial Flowers and hardy Shrubs; *Canterbury* Bells, Lilacs, and the like. Break up and new lay the Gravel-walks. Weed, rake, and clean the Borders, and where the Box of the Edging is decayed, make it up with a freſh Plantation.

Sow Auricula and Polyanthus Seeds in Boxes; theſe ſhould be made of rough Boards ſix Inches deep, with Holes at the Bottom for the running off of Water; they muſt be filled with light Mould, and the Seeds ſcattered thinly over the Surface, then ſome more Mould muſt be ſifted over them a Quarter of an Inch thick, and they muſt be ſet where they may enjoy the Morning Sun.

Plant out Carnations into Pots for flowering.

### *Kitchen Garden.*

Dig and level Beds for ſowing Radiſhes and Onions, Carrots and Parſnips; and *Dutch* Lettuce; Leeks and Spinach, ſhould alſo be ſown now, alſo Beets, Cellery, Sorrel and Marygolds, with any other of the hardy kinds.

Make up the Hot-beds for early Cucumbers, and ſow Cauliflower-ſeeds and ſome others.

Plant Beans and ſow Peaſe; the beſt Way, in theſe uſeful Things, is to ſow a new Crop every Fortnight, that if one ſucceeds and another fails, as will often be the Caſe, there may ſtill be a conſtant Supply, at the due Seaſon, for the Table. Plant Kidney-beans upon a Hot-bed for an early Crop. The Dwarf, White, and *Batterſea* Bean, are the beſt Sorts. They muſt have Air in the Middle of mild Days when they are up, and once in two Days they muſt be gently watered.

Tranſplant Cabbages, plant out *Sileſia* and Cos Lettuce from the Beds where they grew in Winter; and plant Potatoes and *Jeruſalem* Artichokes.

### *Orchard and Fruit Garden.*

Moſt Kinds of Trees may now be pruned, though it be better to do it to the Generality in Autumn; whatever has been omitted at that Seaſon, in this Article, muſt be done now, the hardieſt Kinds being pruned firſt, and ſuch as are more tender at the latter End of the Month, when there will be little Danger of their ſuffering from the Froſts in the wounded Part.

Tranſplant Fruit-trees to Places where they are wanted; opening a large Hole, ſettling the Earth carefully about their Roots, and nailing them at once to the Wall, or faſtening them up to ſtrong Stakes. Nail up the tender Trees with Care, and uncover the Fig-trees by Degrees which have been protected from Froſt by Mats. Sow the Kernels of Apples and Pears, and the Stones of Plumbs for Stocks, and keep off Birds that eat the Buds of Fruit-trees.

## MARCH.

### *Pleaſure Garden.*

Watch the Beds of tender Flowers, and throw Mats over them ſupported by Hoops in hard Weather.

Continue tranſplanting all the hardy perennial fibrous-rooted Flowers, Sweet-williams, Golden-rods, and the like.

Dig up the Earth with a Shovel about thoſe which were planted in Autumn, and clean the Ground between them.

All the Pots of flowering Plants muſt now be dreſſed. Pick off dead Leaves, remove the Earth at the top, and put freſh in the Place, then give them a gentle Watering, and ſet them in their Places for flowering. In doing this take care the Roots are not wounded, and repeat the Watering once in three Days.

The third Week in *March* is the Time to ſow ſweet Peaſe, Poppies, Catchflies, and all the hardy annual Plants.

The laſt Week is proper for tranſplanting Evergreens; and for this Purpoſe a ſhowery Day ſhould be choſen. New Hot-beds muſt be made to receive the Seedlings of annual Flowers raiſed in the former.

### *Kitchen Garden.*

Sow in the Beds of the Kitchen-garden ſome Carrots and alſo the large Peaſe, Rouncevals and Grey.

In better Ground ſow Cabbages and Savoys, alſo Carrots and Parſnips for a ſecond Crop, and towards the End of the Month put in a large Parcel of Beans and Peaſe.

Sow Parſley and plant Mint.

Sow Cos and Imperial Lettuce; and tranſplant the finer Kinds.

In the Beginning of the Month ſow *Dutch* Parſley for the Roots.

The laſt Week take the advantage of Time, or the dry Days, and make Aſparagus-beds.

Clear up the Artichoke-roots, ſlip off the weakeſt, and plant them out for a new Crop, leaving four from each good Root to bear; and from ſuch as are weaker two.

Dig up a warm Border, and ſow ſome *French* Beans, Let them have a dry Soil; and give them no Water till they appear.

### *Orchard and Fruit Garden.*

The Grafts which were cut off early and laid in the Ground to be ready for Uſe, are now to be brought into Service, thoſe of the earlieſt Kinds are to be uſed firſt, and the Apple laſt of all.

This done, let the Gardener look to the Stocks that were inoculated the laſt Year, and take off their Heads. A Hand's Breadth ſhould be left on the above Place: This holds the bud ſecure by tying to it, and the Sap riſes more freely for its Nouriſhment.

The Fruit-trees that were planted laſt *October* muſt be headed; and they ſhould be cut down to almoſt four Eyes. Some leave only three, but four is much better, the Sap riſes more freely.

APRIL.

## APRIL.

### *Pleaſure Garden.*

Tie up ſome Stalks of tall Flowers to Sticks, cut theſe two Feet long, thruſt them eight Inches into the Ground, and let them be hid among the Leaves.

Clean and rake the ground between them.

Take off the Slips of Auriculas, and plant them out carefully for an Increaſe. Tranſplant perennial Flowers and Evergreens as in the former Months; and take up the Roots of Colchicams, and other autumnal bulbous Plants.

Sow *French* Honeyſuckles, Wall-flowers, and other hardy Plants, upon the natural Ground; and the tenderer Kinds on Hot-beds. Tranſplant thoſe ſown laſt Month into the ſecond Hot-bed. Plant ſome Tuberoſe in a moderate Hot-bed, and ſow Carnations and Pinks on the natural Ground on open Borders.

### *Kitchen Garden.*

Plant a large Crop of *French* Beans; and chuſe for them a dry warm Border. Plant Cuttings of Sage and other aromatic Plants. Sow Marrowfat peaſe and plant ſome Beans for a late Crop.

Sow Thyme, Sweet-marjoram, and Savory.

Prepare Dung for making Ridges to receive the Cucumber or Melon-plants deſigned for Bell or Hand-glaſſes.

Sow young Sallading once in ten Days: and ſow ſome Cos and *Sileſia* Lettuces.

The Seeds of all Kinds being in the Ground, look to the growing Crops, clear away the Weeds every where among them, and dig up the Earth between the Rows of Beans, Peaſe, and all other Kinds that are planted at Diſtances. This gives them a ſtrong Growth, and brings them much ſooner in Perfection, then can be done by any other Method.

Draw up the Mould to the Stalks of the Cabbages and Cauliflower-plants; and in cold Nights cover the Glaſſes over the early Cucumbers and Melons.

### *Orchard and Fruit Garden.*

Look to the Fruit-trees againſt the Walls and Eſpaliers. Take off all foreright Shoots, and train ſuch as riſe kindly.

Thin Apricots upon the Trees, for there are uſually many more than can ripen; and the ſooner this is done, the better the others ſucceed.

Water new-planted Trees.

Plant Cuttings of Vines, and look over the grown ones. Nip off improper Shoots. When two riſe from the ſame Eye, always take off the weakeſt.

Weed Strawberry-beds; cut of the ſtrings; ſtir the Earth between them; and once in three Days water them.

Dig up the Earth in the Borders near Fruit-trees. Never plant any large Kind of Flowers or Kitchen-things upon them: And it is better if nothing be ſown or planted on theſe Borders; they all ſtarve the Fruit.

## MAY.

### *Pleaſure Garden.*

Obſerve, when the Leaves of Sow-breads are decayed, take up the Roots, laying them carefully by till the Time of planting.

Take up the Hyacinth-roots which have done flowering and lay them ſideways in a Bed of dry rich Mould, leaving the Stems and Leaves out to die away; this Practice greatly ſtrenghtens the Roots.

Roll the Gravel walks carefully and frequently, and keep the Graſs clean mowed.

Clean all the Borders from Weeds; take of all ſtraggling Branches from the large flowering Plants, and train them up in a handſome Shape.

Plant out *French* and *African* Marygolds, with other Autumnals, from the Hot-beds, the laſt Week of this Month, chuſing a cloudy warm Day.

Tie up the Stalks of Carnations. Plant Cuttings of the Lychinis, and Lychinideas, and ſow the ſmall annuals, Candy-tuft, and *Venus* Looking-glaſs, in the open Ground.

Pot the tender annuals, as Balſams, Amaranths, and the like, and ſet them in a Hot-bed Frame till Summer is more advanced for planting them in the open Ground.

### *Kitchen Garden.*

Water, once in two Days, the Peaſe, Beans, and other large growing Plants.

Deſtroy the Weeds in all Parts of the Ground, and dig up the Earth between the Rows, and about the Stems of all large Kinds.

Sow ſmall Sallading once in ten Days, as in the former Month; And at the ſame Time chuſe a warm Border, and ſow ſome Purſlain: ſow alſo Endive, and plant Beans and Peaſe for a very large Crop, and *French* Beans to ſucceed the others. The great Care in theſe Kinds is to have theſe ſeveral Products freſh and young throughout the Seaſon.

Chuſe a moiſt Day, and an Hour before Sun-ſet plant out ſome Savoys, Cabbages, and red Cabbages, draw the Earth carefully up to their Stems, and give them a few careful Waterings.

### *Orchard and Fruit-Garden.*

If any freſh Shoots have ſprouted upon the Fruit-trees in Eſpaliers, or againſt Walls, nip them off, and train the proper ones to the Wall or Poles, at due Diſtances, and in a regular Manner.

Look over Vines, and ſtop every Shoot that has Fruit upon it, to three Eyes beyond the Fruit. Then train the Branches regularly to the Wall, and let ſuch as are deſigned for next Year's Fruiting, grow ſome time longer, their Leaves will give a proper Shade to the Fruit.

Water the new planted Trees, and keep the Borders about the old ones clear; and finally pick off Snails and other Vermin.

## JUNE.

### *Pleaſure-Garden.*

Chuſe the Evening of a mild ſhowery day, and plant out into the open Ground the tender annuals hitherto kept in Pots in the Hot-bed Frame; they muſt be carefully looſened from the Sides of the Pot, and ſhaken out with all the Mould about them: A large Hole muſt be opened for each; they muſt be placed upright in it, and when ſettled in the Ground, by a gentle watering, muſt be tied up to Sticks.

Let Pinks, Carnations, and Sweet-williams, be laid this Month for an Increaſe. Let the Layers be covered lightly and watered every other Day a little at a Time.

The Spring flowers being now over, and their Leaves faded, the Roots muſt be taken up and laid by for planting again at a proper ſeaſon. Snow-drops, Winter-aconite, and the like are to be thus managed.

The Hyacinth Roots, laid flat in the Ground, muſt now be taken up, the dead leaves nipped off, and the Mould; and, when clean, they muſt be laid upon a Mat in an airy Room to harden, and then laid by.

Tulip Roots muſt now be taken up alſo as the Leaves decay; and the like method muſt be followed with Anemonies and Ranunculuſes.

Cut the Cups or Pods of the Carnations that are near blowing, in three or four Places, that they may blow regularly.

Inoculate ſome of the fine Kinds of Roſes.

### *Kitchen Garden.*

Tranſplant the Cauliflower Plants ſown in *May*. Give them a rich Bed and frequent waterings.

Plant out Thyme and other ſavoury Plants ſown before, and in the ſame manner ſhade and water them.

Take the Advantage of ſome cloudy weather to ſow Turnips; and if there be no Showers, water the Ground once in two Days.

Sow Broccoli upon a rich warm Border, and plant out Cellery for blanching. This muſt be planted in Trenches a Foot and a half deep, and the plants muſt be ſet half a foot aſunder in the Rows.

Endive ſhould alſo be planted out for blanching; but in this the plants ſhould be ſet fifteen inches aſunder, and at the ſame time ſome Endive-ſeed muſt be ſown for a ſecond crop. Pick up Snails; and in the damp evenings kill the naked Slugs.

### *Orchard and Fruit-Garden.*

Repeat the taking off of foreright Shoots upon a Wall and Eſpalier-trees, which we directed laſt month. Train proper branches to their Situation, where they are wanted, once again thin the Wall-fruit; leave Nectarines at four Inches Diſtance, and the Peaches at five; none nearer; the Fruit will be finer, and the Tree ſtronger for next Year.

Inoculate the Apricots, and chuſe for this Operation a cloudy evening. Water new planted Trees, and pick up Snails and Vermin.

JULY.

## JULY.

### *Pleaſure Garden.*

Roll the Gravel frequently, and mow the Graſs.

Clip Box Edgings; cut and trim Hedges; and look over all the Borders; clearing them from Weeds, and ſtirring up the mould between the Plants.

Inoculate Roſes and Jeſſamines of all Kinds that require this Propagation; and any of the other flowering Shrubs.

Take up the Roots of Fritillaries and Maragons and others of this Sort that are paſt flowering ſome time.

Gather the Seeds of Flowers you deſign to propagate, and lay them upon a Shelf in an airy Room in the Pods. When they are well hardened, tie them up in Paper-bags, and do not take them out of the Pods till they are to be uſed.

Lay Pinks and Sweet-williams, as the former, in Earth.

Cut down the Stalks of thoſe Plants which have done flowering, and which you do not keep for Seed; and tie up thoſe now coming into flower to Sticks, as we directed for the earlier Kinds.

Sow Lupines, Larkſpurs, and the like, on dry, warm Borders, to ſtand the Winter, and flower early next Year.

### *Kitchen Garden.*

Sow a Crop of *French* Beans to come in late, when they will be very acceptable,

Clear all the Ground from Weeds.

Dig between the Rows of Beans and Peaſe, mow the Ground alſo about the Artichokes among the Cabbage kind.

Water the Crops in dry Weather.

Spinage-ſeed will be ready for gathering now, as alſo that of the Welch Onion, and ſome others; take them carefully off, and dry them in the Shade.

Take up large Onions, and ſpread them upon Mats to dry for the Winter.

Clear away the Stalks of Beans and Peaſe that have done bearing.

Watch the Melons as they ripen and give them very little water.

Water Cucumbers more freely.

### *Orchard and Fruit Garden.*

Inoculate Peaches and Nectarines.

Take off all Foreright Shoots in the Eſpalier and Wall-fruit Trees.

Hang Phials of Honey and Water upon the Fruit-trees, and look carefully for Snails. Keep the Borders where the Fruit-trees ſtand, clear from Weeds, and ſtir the earth about them. This will greatly aſſiſt the Fruit in ripening.

Look to the Fruit-trees that have been grafted and budded the laſt Seaſon. See that there are no Shoots from the Stocks. Whenever they riſe take them off, for they will rob the intended growth of its nouriſhment.

Look carefully to the new-planted Trees; water them often; and whatever ſhoots they properly make faſten to the Wall or Eſpalier.

Repeat the care of the Vines, take off improper ſhoots, and nail any that are looſe to the Wall. Let no Weeds riſe in the ground about them, for they will exhauſt the nouriſhment, and impoveriſh the Fruit.

## AUGUST.

### *Pleaſure Garden.*

See whether the Layers of Sweet Williams, Carnations, and the like, be rooted; tranſplant ſuch as are, and give frequent gentle waterings to the others to promote it.

Dig up a mellow Border, and draw lines at five Inches diſtance lengthwiſe and acroſs; in the Centre of theſe ſquares plant the ſeedling Polyanthuſes, one in each Square.

In the ſame manner plant out the ſeedling Auriculas. Shade them till they have taken root, and water them once in twenty-four hours.

Cut down the Stalks of Plants that have done flowering. Save the Seeds you want as they ripen.

Water the tender Annuals every evening.

Sow Anemonies and Ranunculuſes, as alſo Fritillary, Tulip and Narciſſus Seed.

Dig up a border for early Tulip roots, and others for Hyacinths, Anemonies, and Ranunculuſes. Sow Annuals to ſtand through the Winter, and ſhift Auriculas into freſh ots.

*Kitchen*

### *Kitchen Garden.*

Sow ſome Spinage upon a rich border, and on ſuch another ſow Onions. Thoſe two crops will live through the Winter, unleſs very ſevere, and be valuable in the Spring. The ſecond week in Auguſt ſow Cabbage-ſeed of the early kinds; and a week after that ſow Cauliflower-ſeed. This will afford the plants that are to be nurſed up under Bed-glaſſes in the Winter. Some of theſe may alſo be ventured in a very well defended ſituation open. The laſt week of this month ſow another crop to ſupply the place of theſe in caſe of accidents; for if the Seaſon be very ſevere, they may be loſt; and if very mild, they will run to ſeed in ſpring. Theſe laſt crops muſt be defended by a Hot-bed frame, and they will ſtand out and ſupply deficiencies.

Sow Lettuces, the Cabbage and brown Dutch kinds in a warm and well-ſheltered piece of ground.

Tranſplant ſome of the Lettuces, ſown earlier, in warm and well-ſheltered Borders.

Take up Garlick, and ſpread it on a Mat to harden; in the ſame manner take up Onions and Rocambole; and, at the latter end of the month, Chalots.

### *Orchard and Fruit Garden.*

Watch the Fruit on your Wall-trees, and keep off Devourers, of which there are numberleſs kinds now ſwarming about them. Shoot all Birds, pick up Snails, and hang Bottles of ſweet Water for Flies and Waſps.

Faſten looſe Branches, and gather the Fruit carefully as it ripens.

Once more go round the Vines, and pull off thoſe trailing Branches ſo very luxuriantly produced at this time. See that the Fruit is not ſhaded by looſe Branches, and keep the Borders clear of Weeds. This tends more than is imagined to the well-ripening of the Fruit.

## SEPTEMBER.

### *Pleaſure-Garden.*

A new kind of Work begins this month; which is, preparing for the next Seaſon. Tear up the Annuals that have done flowering, and cut down ſuch Perennials as are paſt their Beauty, bring in other Perennials from the Nurſery Beds, and plant them with Care at regular Diſtances.

Take up the Box-edgings where they have outgrown their proper Size, and part and plant them afreſh.

Plant Tulip and other Flower-roots.

Slip Polyanthuſes, and place them in rich ſhady Borders. Sow the Seeds of Flower-de luces and Crown Imperial, as alſo of Auriculas and Polyanthuſes according to the Method we delivered before.

Alſo part off the Roots of Flower-de-luces, Piony, and others of theſe Kinds. In the laſt Week tranſplant hardy flowering ſhrubs, and they will be ſtrong next ſummer.

### *Kitchen Garden.*

Sow Lettuces of various Kinds, *Sileſia*, *Cos*, and *Dutch*, and when they come up ſhelter them carefully. The common Practice is to ſhelter them under Hand-glaſſes; but they will thrive better under a ſloping Reed-hedge, ſuch as we deſcribed before.

Make up freſh warm Beds with the Dung that has lain a Month in the Heap. Plant the Spawn in theſe Beds upon Paſture Mould, the ſame they were found in; and raiſe the Top of the Bed to a Ridge, to throw off Wet.

Look to the Turnip-beds and thin them, leave the Turnips at ſix inches Diſtance.

Weed the Spinage, Onions, and other new-ſown Plants.

Tranſplant Sage, Lavender, and ſweet Plants. Earth up the Cellery as it grows up in Height.

Sow young Sallading upon warm and well ſheltered Borders.

Clean Aſparagus Beds in this Manner:—Cut down the Stalks, and pare the Earth off the Surface of the Alleys, throw this upon the Beds half an inch thick, and ſprinkle over it a little Dung from an old Melon-bed.

Dig up the Ground where Summer Crops have ripen'd; and lay it in Ridges for the Winter. Theſe ſhould be diſpoſed Eaſt and Weſt, and turned once in two months, they have thus the Advantage of a Fallow.

Plant ſome Beans and ſow ſome Peaſe on warm and well-ſheltered Borders, to ſtand out the Winter.

### *Orchard and Fruit Garden.*

The Fruit muſt now be gathered with Care every Day, and the beſt Time is an Hour after Sun-riſe. Then it ſhould be laid in a cool Place till uſed. Such as is gathered in the middle of the day is always flabby.

Keep Birds from the Grapes, for as they now begin to ripen they will be in continual danger.

Tranſplant Gooſberries and Currants, and plant Strawberries and Raſberries; they will be rooted before Winter, and flouriſh the ſucceeding Seaſon.

## OCTOBER.

### *Pleaſure Garden.*

Let all the bulbous roots for Spring flowering be put into the ground. Narciſſus', Miragon, Tulips, and ſuch Ranunculuſes and Anemonies as were not planted ſooner.

Tranſplant Columbines, Monks-hood, and all kinds of fibrous rooted Perennials.

Place the Auriculas and Carnations, that are in pots, under ſhelter.

Some lay the pots on one ſide, but that ſpoils the bud for next year's flowering. The beſt way is by means of a ſloping reed-hedge. Dig up a dry border, and if not dry enough naturally, dig in ſome ſand. In this ſet the pots up to the brim. Place the reed-hedge ſloping behind them, and faſten a mat to its top that may be let down in bad weather.

Take off the dead leaves of the Auriculas before they are thus planted.

Bring into the Garden flowering ſhrubs whenever they are wanted, and at the end of the month prune ſome of the hardier kind.

### *Kitchen Garden.*

Plant out the Cauliflower plants where they are to be ſheltered; and it will be proper to plant two for each glaſs, where that method is uſed, for fear of one failing.

Sow another crop of Peaſe, and plant more Beans; chuſe for theſe a dry ſpot and well ſheltered from the cold wind of winter.

Tranſplant the Lettuces ſowed laſt month, where they can be defended by a Reed-hedge, or under walls.

Tranſplant Cabbage-plants and Coleworts where they are to remain.

Take great care of the Cauliflower-plants ſown early in Summer; they now begin to ſhew their heads, ſo break in the leaves upon them to keep off the ſun and rain; it will both harden and whiten them.

### *Orchard and Fruit Garden.*

Prune the Peach and Nectarine trees and the Vines. This is a very uſeful Practice, for it ſtrengthens the buds for ſpring.

Cut Grapes for preſerving, with a joint of the Vine to each bunch.

Gather fruits for winter keeping as they ripen. Tranſplant all Garden trees for flowering; prune Currant-buſhes, and preſerve the ſtones of the fruit for ſowing.

## NOVEMBER.

### *Pleaſure Garden.*

Throw together a good heap of paſture ground, with the turf among it, to rot for mould on the borders.

Tranſplant Honey-ſuckles and Spireas, with other hardy flowering ſhrubs.

Rake over the beds of ſeedling flowers, and ſtrew ſome pea-ſtraw over them to keep out the froſt.

Cut down the ſtems of Perennials which have done flowering; pull up annuals that are ſpent, and take and clear the ground.

Place hoops over the beds of Ranunculuſes and Anemonies, and lay mats or cloths in readineſs to draw over them, in caſe of hard rains or froſt.

Clean up the borders in all parts of the garden, and take care to deſtroy not only the weeds, but all kinds of moſs.

Look over the ſeeds of thoſe flowers which were gathered in ſummer. See they keep dry and ſweet, and in a condition of growth, and dig a border or two for the hardier kinds.

### *Kitchen Garden.*

Weed the crops of Spinage and ſuch other kinds as were ſown late, for the wild growth will elſe ſmother and ſtarve the crop.

Dig up a border under a warm wall, and ſow ſome Carrots for ſpring; ſow Radiſhes in ſuch another place, and ſee the ground be well and deep dug for both. Turn the Mould that was trenched and laid up for fallowing; this deſtroys Weeds, and prepares the Soil to be enriched by the Air.

Prepare ſome Hot-beds for Sallading; cover them five Inches with Mould, and ſow upon them ſome Lettuces, and the common ſmall Sallading, Muſtard, Rape, Creſſes, and Radiſh.

Plant another Crop of Beans; and ſow more Peaſe for a Succeſſion.

Trench the Ground between the Artichokes, and throw a thick Ridge of Earth over the Roots. This will preſerve them from the Froſt, and prevent their ſhooting at an improper Time.

Make a Hot-bed for forced Aſparagus.

Take up Carrots and Parſnips, and lay them in Sand to be ready for uſe. Give Air at Times to the Plants under Hand-glaſſes and in Hot-beds, or they will ſuffer as much by want of that, as they would have done by the Froſt.

### *Orchard and Fruit Garden.*

Stake up all Trees planted for Standards, or the winds will rock them at the bottom, and the Froſt will be ſet in and deſtroy them.

Throw a good Quantity of Peaſe-ſtraw about them, and lay on it a good Quantity of Brickbats or Pebbles to keep it faſt; this will mellow the Ground, and keep out the Froſt.

Continue to prune Wall-fruit Trees, and prune at this Time alſo the Apple and Pear Kinds. Pull off the late Fruit of Figs, as it would decay and rot the Branches.

## DECEMBER.

### *Pleaſure-Garden.*

Draw the Mats and Cloths over the Ranunculus and Anemony Beds in ſevere weather, whether Froſt or cold Rain: but give them Air in the Middle of every tolerable Day, and ſoon as poſſible, uncover them all Day; but draw on the Mats againſt Night.

Throw up the Earth where flowering Shrubs are to be planted in Spring; and once in a Fortnight turn it.

Dig up the Borders that are to have Flower-roots planted in them in the Spring, and give them the Advantage of a Fallow, by throwing up the Ground in a Ridge.

Scatter over it a very little rotten dung from a Melon bed, and after this turn it twice during the winter.

Look over the flowering ſhrubs and prune them. Cut away all the dead wood, ſhorten luxuriant branches, and if any croſs each other, take away one. Leave them ſo that the air can have free paſſage between them.

Sift a quarter of an Inch of good freſh mould over the roots of Perennial flowers whoſe ſtalks have been cut down, and then rake over the borders. This will give the whole an air of Culture and good management, which is always pleaſing.

### *Kitchen Garden.*

Plant Cabbages and Savoys for ſeed. This is to be done with great care; dig up a dry border, and break the mould very well; then take up ſome of the ſtouteſt Cabbage and Savoy plants; hang them up by the ſtalks five days, and then plant them half way of the ſtalks into the ground, draw up a good quantity of the mould about the part of the ſtalk that is out of the ground, and make it into a kind of hill round each; then leave them to nature.

Sow another crop of Peaſe, and plant another parcel of Beans to take their chance for ſucceeding the others.

Make another Hot-bed for Aſparagus, to yield a ſupply when the former is exhauſted. Continue to earth up Cellery, and cover ſome Endive with a good quantity of Peaſe-ſtraw, as it is growing, that you may take up when wanted, which otherwiſe the froſt will prevent.

### *Orchard and Fruit Garden.*

Prepare for planting Trees where they will be wanted in Spring, by digging the ground deep, and turning it well now in the places where they are to ſtand.

Scatter over the borders, where the Fruit-trees are planted, ſome freſh mould, and ſome old dung, and in a mild day dig it with a ſtrong three pronged fork.

Look over the Orchard trees, and cut away ſuperfluous and dead wood. Let the branches ſtand clear of one another that the air may get between, and the fruit will be better flavoured,

This is the management of old trees, and new planted ones are to be preſerved by covering the ground at their Roots.

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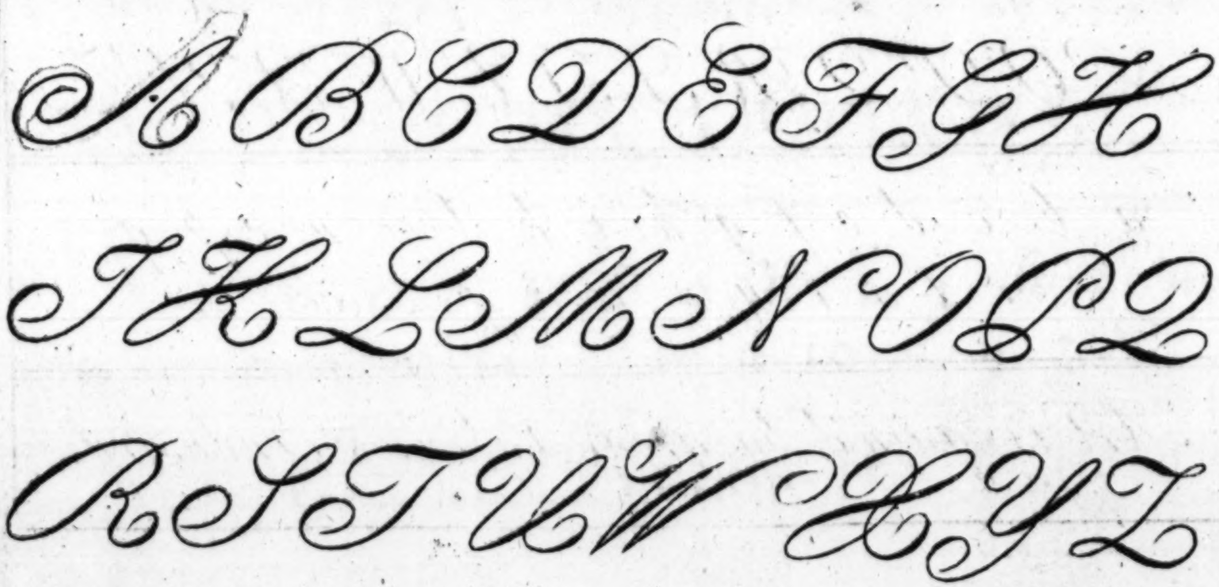
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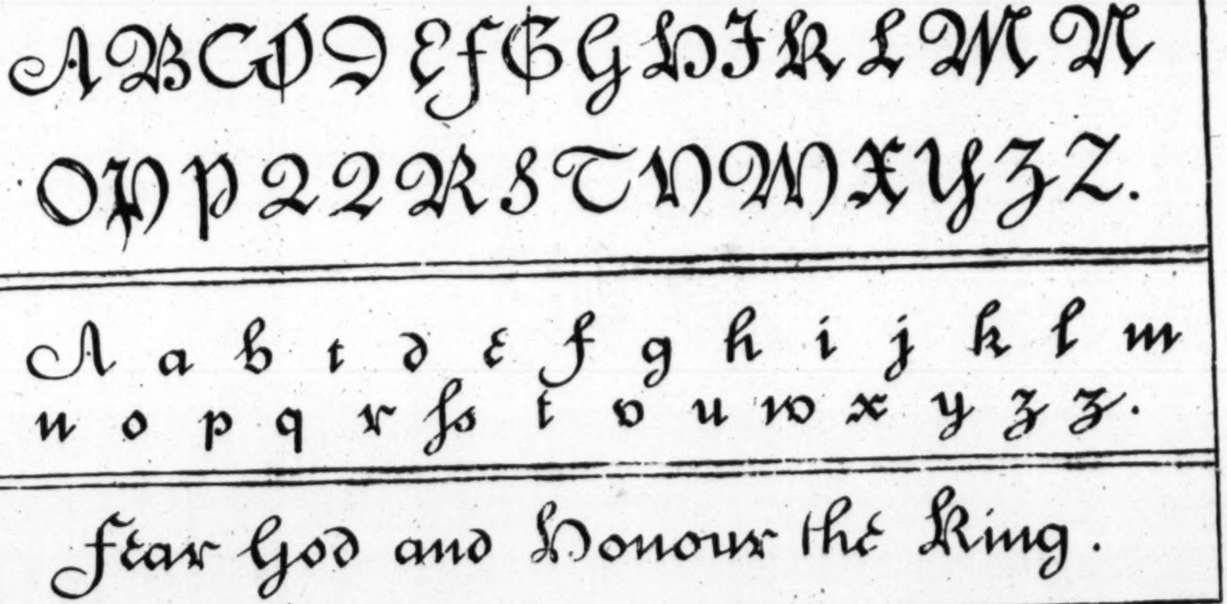
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